

MODERN PLASTICS

m
—
p

MAY 1952

Why not think BIG when you plan on plastics?



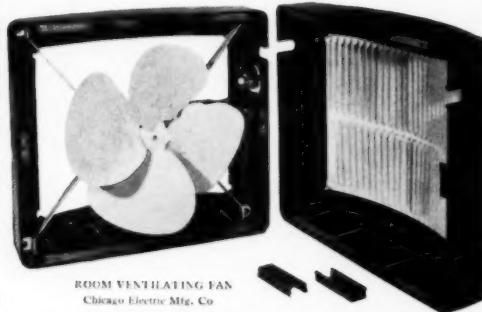
TELEVISION CABINET
Motorola, Inc.



POPCORN WARMER BASE
Buddy Boy Popcorn Co.



HEAVY-DUTY SWITCH PANEL
L. T. E. Circuit Breaker Co.



ROOM VENTILATING FAN
Chicago Electric Mfg. Co.

...see your molder about big DUREZ pieces

If you have always limited your thinking on plastics to fairly small pieces, we invite you to consider them in a brand new light . . . as material for major units or components.

Bigger presses, improved techniques in custom molding, and the versatility of phenolics developed by Durez have greatly enlarged the utility of moldings in recent years.

Pieces weighing up to 40 pounds and more are now turned out, ready for assembly, at mass production speed. These range up to 15" x 18" x 36", and their size is determined only by the capacity of available presses. The

larger the size, the greater is the economy available through elimination of many machining, assembly, and finishing operations.

In large and small moldings the inherent characteristics of Durez phenolics have won them an important place in industry. They mold to critical tolerances. They have outstanding electrical values and resistance to chemicals and to heat, plus impact strength and permanence of finish.

It will pay you to discuss your large projects with your custom molder. For specialized assistance, feel free to call on Durez technicians in your area.

PHENOLIC PLASTICS THAT FIT THE JOB





"Have Fun, Son!"

Knowing that "Jr. Commanders" demand action and realism, IDEAL TOY* molds its Silvertone Military Line of...

Catalin Styrene

"On Land . . . at Sea . . . and in the Air — this aggregation can well be called a matchless massing of 'military' might!" The individual units, all of which are molded of a realistic "battle-toned" CATALIN STYRENE, are flawlessly detailed, strongly constructed, light in weight and sell from a dime to a dollar!

Great fun! Propellers twirl and it's "bombs away" when the "B 25's pilot" is over the run. Headquarter's cars roll out as the Command Plane comes to a 3 point landing. Tanks rumble. Guns rotate. Bulldozers "nose in". Howitzers fire "live" ammunition — and the fleet covers the action with seaworthy support!

As the smoke of each skirmish pales, we're certain that "Young America's 5 Star Generals and Admirals" will agree that CATALIN STYRENE is "top-sergeant-tough"!

*Ideal Toy Corporation, New York 10, N. Y.

CATALIN CORPORATION OF AMERICA
ONE PARK AVENUE • NEW YORK 10, N. Y.



In addition to Styrene Molding Compounds, Catalin's chemical family includes a wide range of Urea, Phenolic, Cresylic, Resorcinol, Melamine and Styrene Resin formulations.

MODERN PLASTICS*



VOLUME 29

MAY 1952

NUMBER 9

CONTENTS

MODERN PLASTICS BULLETIN

A Special News Service Facing p. 70

GENERAL SECTION

The Challenge of Better Plastics (Editorial)	5
Progress Report on Plastics Pipe	75
A number of materials are now being used in the commercial production of pipe for many purposes	
Foamed Vinyl From Open Molds	83
Material is foamed by gas under pressure, is molded in the simplest of molds	
One Portion at a Time	84
Individual-portion food packages formed from vinyl sheet are produced at the rate of 300 per minute	
Britain's Plastics Industry	86
by W. M. York Brief survey of potential production capacity and of growing domestic and industrial applications	
At the 5th N.P.E.	87
Review of the most important and significant developments that were on display at the recent exposition	
Feeding Cup for the Sick	89
Design of new molded nylon cup solves sick-room problems	
Radiation Demonstrator	90
Full-size translucent model of a human head is cast from an epoxy type phenolic	
Flash-Holder Depends on Plastics	92
by H. L. Malone New unit uses plastics to improve appearance, feel, and performance	
Keeping Butter Better	94
Molded styrene compartment mounts directly into the inner door liner of a new refrigerator	
Plastics Products	96
What's new on the shelves of retail stores throughout the country	
5th National S.P.I. Conference	154
Canadian S.P.I. Conference	161
Embedded Display	169
Three-Way Dispenser	171
Anti-Static Applicator	172

Lawn Sprinkler in Plastics	175
Heating Element	180
Phenolic Switch	182
Powder Palette	184

PLASTICS ENGINEERING

Current Techniques for the Injection Molding of Nylon	101
by L. Paggi A discussion of up-to-date molding techniques, based on six years of accumulated experience	
Rotational Casting of Plastisols	109
Automatic machine uses mold conveyor systems in which molds are rotated in several planes	

TECHNICAL SECTION

The Role of Hydrogen Chloride in Polyvinyl Chloride Degradation	111
by A. L. Scarborough, W. L. Kellner, and P. W. Rizzo Report of a study of a factor of importance to the vinyl industry	
Exotherm Curves for Cold-Setting Polyester Resins	124
by F. S. Nichols and C. H. Bliss A scientific tool for use in the so-called cold-setting technique for curing polyesters	

DEPARTMENTS

Plastics Digest	126
U. S. Plastics Patents	132
New Machinery and Equipment	140
Books and Booklets	146
Production of Plastics Materials	152

THE PLASTISCOPE

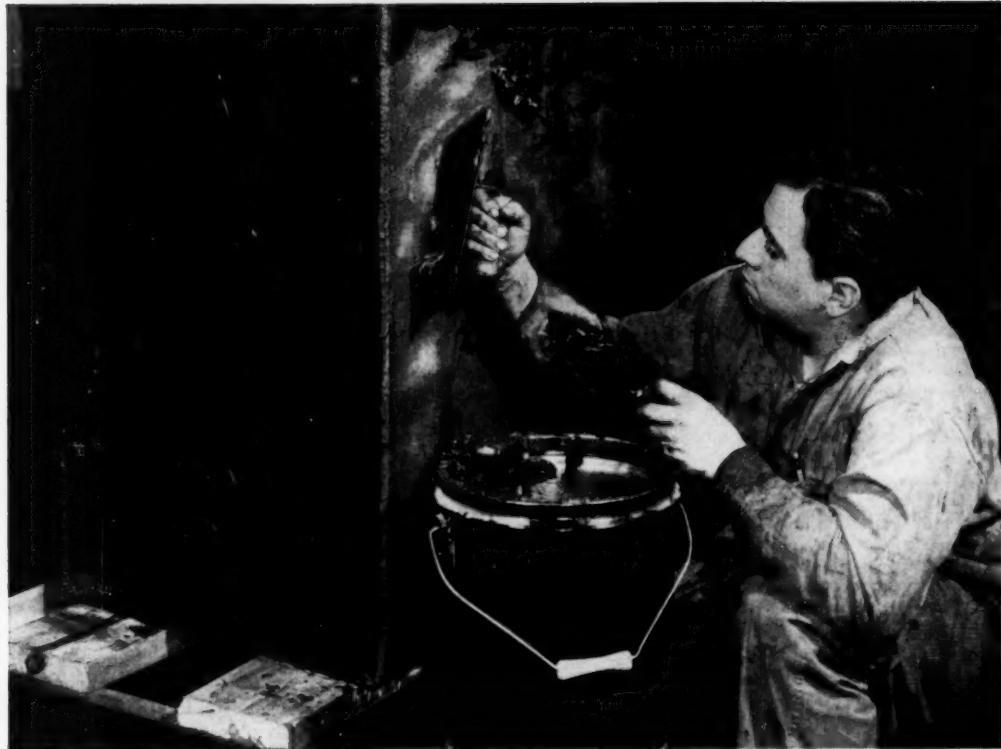
News of the Industry; Predictions and Interpretations; Company News; Personal; Meetings

Modern Plastics, published monthly by Breskin Publications, Inc., at Emmett St., Bristol, Conn. Executive and Editorial Office: 575 Madison Ave., New York 22, N. Y. Entered as second class matter at the Post Office at Bristol, Conn., December 14, 1950, under the Act of March 3, 1879. Copyright 1952 by Breskin Publications, Inc. All rights reserved. Subscription \$6.00 a year; \$10.00 for two years; \$15.00 for three years in U.S. and its possessions, South America, and Canada. All other countries \$8.00 a year; \$12.00 for two years, \$15.00 for three years, payable in U.S. currency. Price of this issue 75 cents per copy in the U.S. and its possessions, South America, and Canada; all other countries \$1.00. Printed in the U.S.A. by the Hildreth Press, Inc., Bristol, Conn.

*Reg. U. S. Pat. Office

Another new development using

B. F. Goodrich Chemical *raw materials*



B. F. Goodrich Chemical Co. does not make this coating compound. We supply the raw materials only.

New Idea in Plastics! SPREADS LIKE PUTTY... HARDENS AGAINST CORROSION

THIS newly-developed plastic compound greatly simplifies many coating operations—has more cost-saving possibilities. Based on Geon paste resin, it is putty-like in form. It can be applied with a hand trowel on any surface, to any desired thickness.

On the plating rinse tank pictured, for example, it is simply spread on the outside surface...protects against acid spillage, plating salts and other corrosive chemicals. Formerly, applying a coating like this—usually $\frac{1}{16}$ "-. $\frac{1}{8}$ "—was difficult to do without costly, special dipping equipment.

The coating is fused by oven bak-

ing or infra-red lamps. Containing no volatile materials, it is safe to use; there is no viscosity change during storage. And because it is based on Geon, it has all of Geon's advantages—resistance to most acids and chemicals...oils...greases...abrasion and aging.

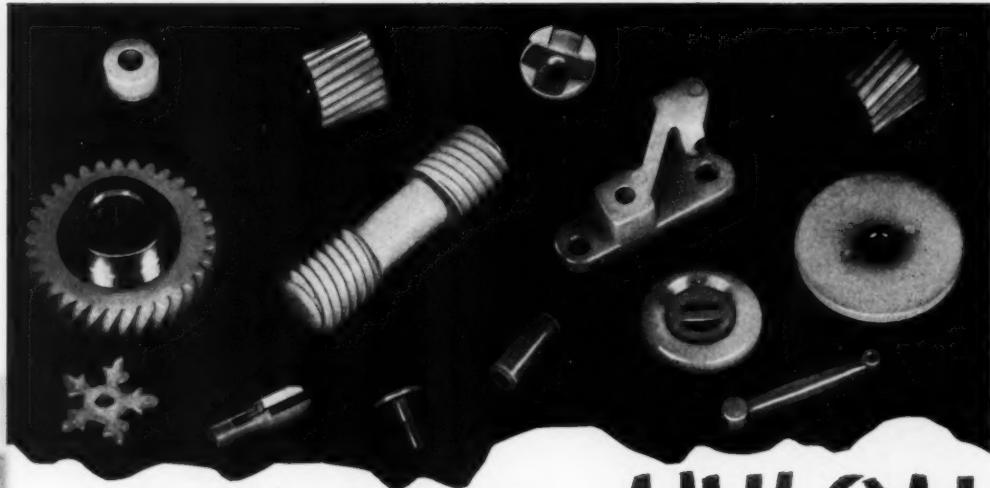
Geon materials—resins, latices and compounded plastics—are used in scores of ways. They help make durable flooring, long-wearing upholstery, rigid tubing and paneling, fire-resistant safety clothing and more saleable products. Find out how they may help you improve or develop

products. For technical bulletins, write Dept. GA-5, B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, O. In Canada: Kitchener, Ontario. Cable address: Goodchemco.



GEON RESINS • GOOD-RITE PLASTICIZERS...the ideal team to make products easier, better and more saleable.

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors



HOW CHICAGO MOLDED NYLON PROVIDES BETTER MECHANICAL PARTS

If you are a quantity user of small mechanical parts you will find it profitable to investigate the advantages of Chicago Molded nylon. And for good reason. Nylon is exceptionally tough and resistant to wear. Its structure tends to dampen vibration and lessen noise. In many applications nylon requires little or no lubrication. And it is not affected by petroleum oils and greases, alkalis and dilute acids.

Balance these qualities and characteristics against the requirements of such things as your gears, bearings, pawls, grommets, cams, bobbins and washers. It's easy to see why the preference for nylon continues to grow.

However, nylon itself is only a raw material. Its performance, as a part of your product, depends upon the way it is molded. Its fabrica-

tion requires the "know-how" that comes only with long experience.

And, speaking of experience, Chicago Molded was one of the very first to mold nylon and is today one of the largest molders of nylon parts. Such experience can help you to utilize the tremendous advantages of nylon to the fullest extent.

Of course, we mold all other plastics materials, too. You'll find here the most modern facilities for compression, injection and transfer molding . . . every needed size and type of press for fast, economical production of even your largest quantity requirements.

So...if it calls for molded plastics, it will pay you to discuss plans with a Chicago Molded engineer. Just write, wire or phone. There's no obligation.



ASK FOR THIS BULLETIN

It contains worthwhile information about nylon, its qualities and characteristics, and discusses many typical applications. Write for your free copy—on company letterhead, please.

CHICAGO MOLDED PRODUCTS CORPORATION

CUSTOM MOLDERS
OF ALL

Plastics



1046 NORTH KOLMAR AVENUE • CHICAGO 51, ILLINOIS

Modern Plastics



EDITORIAL

The Challenge of Better Plastics

A period in which materials are in long supply always does an industry a lot of good, providing that industry has the management approach and engineering and technical talent to accept the condition of ample supply as a challenge to improve. The alternative, of course, is a material price war.

The acceptance by the plastics industry of the challenge to upgrade materials and applications was strongly evidenced at the Fifth National Plastics Exposition.

An example is what is happening in the case of styrene plastics. Copolymerization of styrene with other materials such as acrylonitrile, blending of styrene with other materials, and modifications in polymerization processes, are giving us a whole new range of styrene-based plastics with which to increase the number and volume of applications in fields in which this plastic is established, and with which to open up vast new fields.

Another example is the pre-coated fibrous glass materials, some of which were introduced at the N.P.E., which make possible faster, cleaner, and more economical operations in reinforced plastics molding. Still other examples are the new rigid vinyls, the broadened range of the fluorocarbons, the increased attention given to the epoxies, and the new developments in plastisols.

In the machinery field, improved controls on extruder heating units, new and fast vacuum forming methods for sheet materials, and the first showing of the new super-colossal presses for low-pressure metal-to-metal molding of reinforced plastics pieces, are indicators of the same acceptance of the challenge of a good supply of plastics.

By the very nature and range of our work, practically nothing at any plastics exposition is new to the editors of **MODERN PLASTICS**, and little of it should be new to regular readers of this magazine.

But at each such event, the total philosophy of the industry is exposed, and trends are discernible. The present aggressive acceptance of the challenge of good supply on the part of both material makers and processors is splendid. And the obvious trend toward broadened fields of application for the resulting improved plastics materials is heartening.

We're only beginning. The opportunities for plastics are greater than they have ever been, and the opportunities for stable operations at the level of molders, extruders, calenders, and fabricators, are good, possibly for the first time in the history of the industry, because of supply stability.

While this was an industrial show, the constantly increased interest of the public in plastics, and the constantly improving opinion of the public and press, was indicated by the attention given to various elements in the event by huge national magazines, by the industrial press, by newspapers, and by television.

General consensus of all who participated was that the Fifth National Plastics Exposition was the best show yet. We believe that the chief reason for this opinion lies in this industry's approach to the challenge of good materials supply—and to the ability of its technicians and engineers to make still better plastics and use them to better advantage. [For the N.P.E. report by **MODERN PLASTICS**'s editorial team, see page 87.]

President and Publisher

CHARLES A. BRESKIN

Editorial Staff

Editor: HIRAM McCANN
Technical Editor: DR. GORDON M. KLINE
Engineering Editor: FRED B. STANLEY
Senior Editor: R. L. VAN BOSKIRK
Managing Editor: A. PAUL PECK
Art Director: DONALD R. RUTHER
Associate Editor: WARREN H. GOODMAN
Assistant Managing Editor: JOEL FRADOS
Assistant Editor: JOAN MOISSEIFF
Midwestern Editor: VAL WRIGHT
Readers Service Editor: P. P. PHILIPSON

Business Staff

Vice President and General Manager:
ALAN S. COLE

P. H. Backstrom
M. A. Olsen
J. M. Connors
R. C. Beggs
Asst. Gen. Manager: PHILIP W. MULLER
Promotion Manager: HERBERT FRIEDMAN
Production Manager: DANIEL M. BROADS
Asst. Production Manager: B. J. FARINA
Production: SEYMOUR S. SCHWARTZ
Asst. to Publisher: THEODORE B. BRESKIN

Circulation Department
Circulation Manager: FREDERICK A. KLEIN

Executive and Editorial Offices

575 Madison Ave., New York 22, N. Y.
Tel., PLaza 9-2710

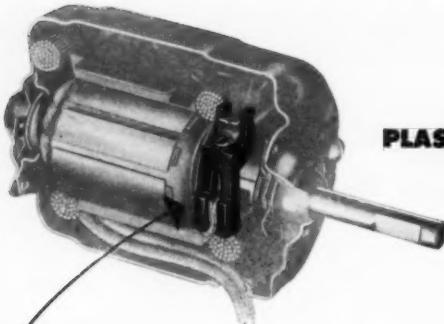
Branch Offices

Chicago 11: 101 E. Ontario St.
J. M. Connors Tel., Delaware 7-0060
Cleveland 14: 815 Superior Ave.
R. C. Beggs Tel., Superior 1-0737
Los Angeles 17: 816 West Fifth St.
J. C. Galloway Tel., Mutual 8335
England: 10/12 Broad St. Ave.,
Bloomfield St., London, E. C. 2
L. H. Dolaro Tel., London Wall 4231

MODERN PLASTICS is fully protected by copyright and nothing that appears in it may be reprinted wholly or in part without special permission.



Member Audit Bureau of Circulations
MODERN PLASTICS is regularly indexed in Industrial Arts Index and Industex.



PLASTICS BRUSH HOLDER FOR THE

Redmond MICROMOTOR

*Molded to $\pm .002$ " tolerances
Distortion
eliminated!*

Rejects reduced greatly, using
INSUROK®, special mold design,
and special molding technique
developed by **RICHARDSON**



This miniature brush holder presented a serious problem for Redmond Company, Inc., Owosso, Michigan. Not only was the intricate, irregularly shaped part difficult to mold under any circumstances, but extremely close tolerances and great dimensional stability were required, plus physical strength and clean surfaces. Using ordinary molding procedures, rejects were prohibitively high.

Richardson engineers solved the problem with an INSUROK material and a highly specialized molding technique that provides adequate physical strength, holds critical dimensions to $\pm .002$ ", eliminates distortion, and sharply reduces assembly costs.

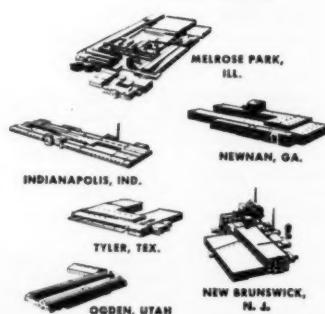
Ned Sebring, Redmond's Director of Purchases, writes, "We have found the INSUROK brush holders made by The Richardson Company to be far superior to those of any previous supplier."

Investigate Richardson's specialized plastics services for your product.

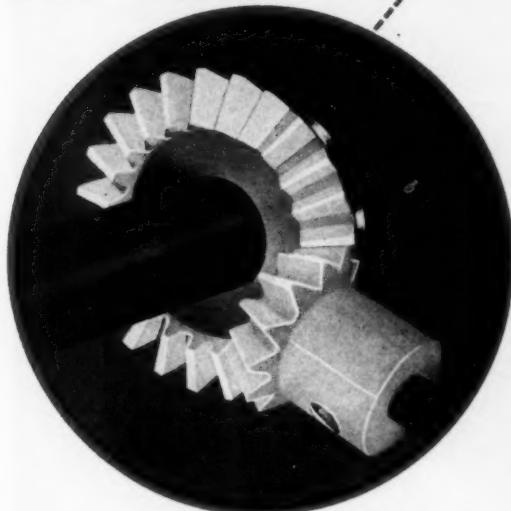
The RICHARDSON COMPANY

FOUNDED 1858—LOCKLAND, OHIO

2789 Lake St., Melrose Park, Illinois (Chicago District)

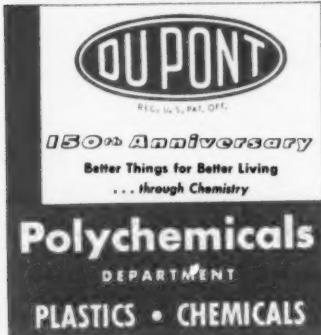


Shock-absorbent gears of Du Pont nylon plastic



THE SMALL GEAR on the feed roll assembly engages the drive gear while the shaft is turning at full speed. Both gears (shown here in approximately actual size) are molded of Du Pont nylon.

GEARS molded by Northern Industrial Chemical Co., Boston, Mass., for use on "Duplex" Ring Twister made by Fletcher Works, Philadelphia, Pa.



take stress of meshing with moving gear; cut costs and simplify maintenance

The revolving feed rolls of this textile machine deliver threads to the spinning ring and spindle for twisting into yarn. Each pair of rolls is driven by a bevel pinion gear which is in turn powered by a larger bevel gear mounted on the drive shaft. At intervals in the course of the operation, the bevel pinion is engaged and disengaged from the continuously revolving bevel gear.

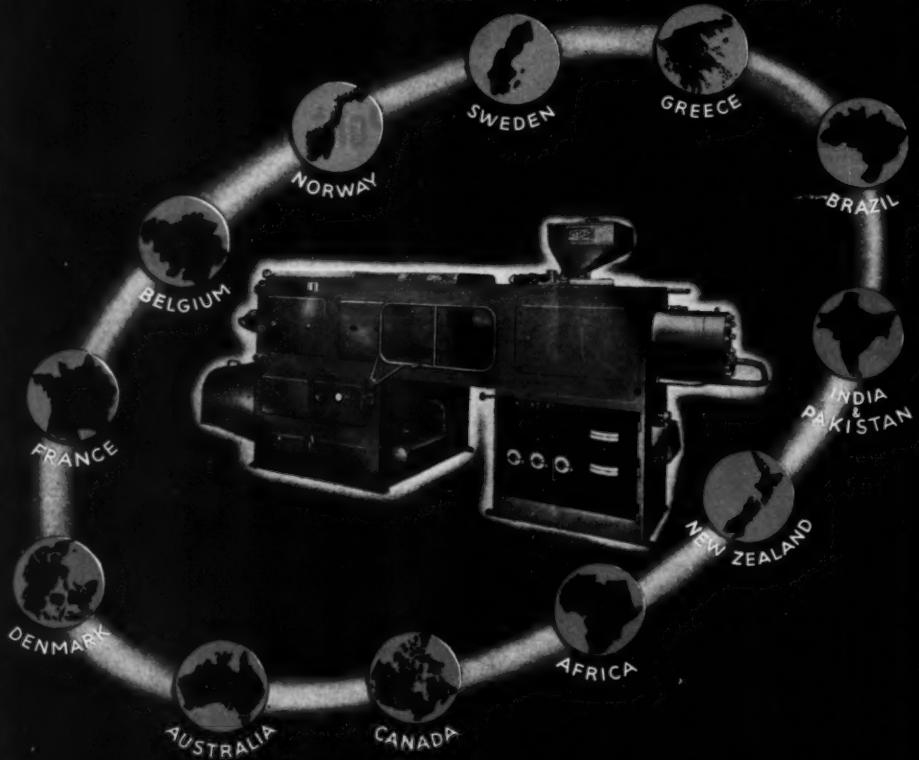
The gears, made of Du Pont nylon plastic, absorb this shock without chipping, denting, or excessive wear. Because of nylon's resilience, it literally "soaks up" sudden stress... its abrasion-resistance and low coefficient of friction protect gear faces against grinding each other as they engage. And even in the relatively thin sections of these gear teeth, nylon has the strength to do work that once called for steel.

Yet these molded nylon gears cost less than the machined steel gears formerly used. Further, the economies of injection-molding permit production of the drive gear in two sections, hardly feasible with a bevel gear machined from steel. Thus the new gears are easily removable and represent additional savings in maintenance over the former one-piece metal gears.

This is another interesting use of Du Pont nylon plastic as an engineering material. It may pay you to investigate its unique combination of properties. For additional information on nylon and other Du Pont plastics, write:

E. I. du Pont de Nemours & Co. (Inc.),
Polychemicals Department, District Offices:
350 Fifth Avenue, New York 1, New York
7 South Dearborn Street, Chicago 3, Illinois
845 East 60th Street, Los Angeles 1, California

MOULDING THROUGHOUT THE WORLD



INJECTION MOULDING MACHINES

In all of the five continents, FECO Injection Moulding Machines are now operating. They are manufactured by the Projectile & Engineering Co. Ltd., in 2 oz., 4 oz., 8 oz. and 16 oz. capacities. They are self-contained with automatic cycle, and hydraulically operated; and have a high plasticising capacity and rate of injection. Mould-locking pressure and platen area enable them to operate at a high rate of production.

PICO MOULDS. Expert Designers and mould makers are employed and moulds can be supplied to samples submitted, including die-sinking models if desired. An important side of the Company's work is the hobbing of cavities for moulds and medallions — the plant includes a 3,000-ton Hobbing plant. Master hobs to customers' samples made as required.

Full particulars of our range of Injection Moulding Machines and Moulds will be sent on request.



THE PROJECTILE & ENGINEERING CO. LTD.

ACRE STREET, BATTERSEA, LONDON, S.W.8, ENGLAND

Telephone: Macaulay 1212. Telegrams: "Projectus, Charing, London". Cable: Projectus, London.

You are cordially invited to inspect our exhibits at the Canadian International Trade Fair.



All leading manufacturers of Safety Equipment use Celanese* *Acetate* Sheeting

Goggles, shields, respirators, machine guards, other safety equipment gain these extra values when made of acetate:

shatter-proof toughness

non-flammability

optical clarity

dimensional stability

lasting transparency

touch-comfort

smooth, easy-to-clean surface

Leading manufacturers are sold on acetate's flexibility, ease, and economy in fabrication.

Celanese acetate scores better, blanks easier. It can be heat-formed, drawn, blown . . . stitched, cemented, solvent-bonded . . . conveniently sized in cut sheets and continuous lengths . . . widths up to 31" . . . thicknesses from .003" to .250" . . . clear or tinted.

Consider acetate sheeting for your product's future. Complete information from your Celanese representative or write to Celanese Corporation of America, Plastics Division, Dept. 101-E, 180 Madison Avenue, New York 16, N. Y. In Canada, Canadian Cellulose Products, Ltd., Montreal and Toronto.

Celanese
Acetate SHEETING

*Reg. U. S. Pat. Off.

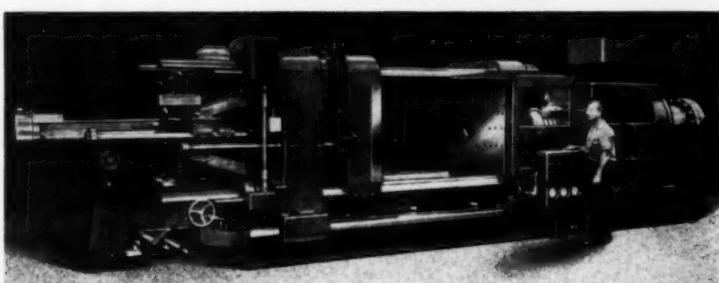


The "Big News" emanates from Ger-Ell Manufacturing Co. in Chicago, Ill., where a 60 oz. Reed-Prentice Injection Machine is molding this solid 96 oz. toilet seat and cover in polystyrene without sink marks or blemishes.

1500T—200 oz.
Reed-Prentice
Injection Molding
Machine

This worthy achievement is further proof of the "bonus capacity" built into all "REEDS" — from 2 to 200 oz. Such hard-to-run molds are no trouble for the rugged, efficient Reed-Prentice presses.

Send for Catalog No. 31 to get the latest data on all "REEDS"



THE WORLD'S LARGEST MANUFACTURER OF INJECTION MOLDING MACHINES

REPRESENTATIVES:
Grand Rapids Joseph Monahan Co.
Syracuse J. F. Owens Machinery Co.
Houston Preston Machine Tool Sales Co.
Seattle & Spokane Star Machinery Co.
Minneapolis Chas. W. Stone Co.
Los Angeles Western Molders Supply Co.



MAIN OFFICE
677 Cambridge St., Worcester 4, Mass.
BRANCH OFFICES
75 West St., New York 6, N. Y.
1213 West 3rd St., Cleveland 13, Ohio
2400 W. Madison St., Chicago 12, Illinois
2842 W. Grand Blvd., Detroit 2, Mich.

For Ideal Custom Molding sit down with the Ideal Man

He represents the world's largest,
best equipped custom injection molder



Above and beyond the factor of service, know-how, experience and experience in ordering custom molding from Ideal Plastics have been emphatic about two basic things—the cooperative service and quality molding you have received.

SERVICE

The Ideal Man, backed as he is by the flexibility of the world's largest custom injection molding plant, often is in a position to make valuable design and production suggestion which can result in superior products, molded at lower cost. Where time is a factor, he usually can promise and deliver your parts when you need them, not a week or a month later; although he won't go overboard and promise to perform the impossible.

QUALITY

The system Ideal Plastics uses to ensure quality is probably without peer. Beginning with making of the molds, nearly 100 which are machined in Ideal's own high dollar toolroom, every production step is scrutinized by careful inspection; constant check is made on raw materials and finished items by Ideal's chemical and physical laboratories. Assembly, handling, packing and shipping are in-plant operations, too . . . under continuous quality supervision.

Next time you have an item to be custom injection molded, sit down and talk it over with the Ideal Man. He's at your service, whether you are in New York, Chicago or a thousand miles away. Address your inquiries to A. C. Manevill, Vice-President in Charge of Sales, Ideal Plastic Corporation, 184-18 Jerome Avenue, Hollis 7, New York. Phone: AXcel 7-7000. Midwest Representative, Steel Mill Products Co., 176 West Adams Street, Chicago 3, Illinois. Phone: CEntral 6-5136.

Better Molded Plastics



for Industry & Home

For Superior Performance . . . For Lasting Satisfaction

Specify

Vinylite

PLASTIC RIGID SHEETS

The Vinylite Plastic Rigid Sheet is a non-shrinking, dimensionally stable sheet especially suited for many purposes. It can be easily formed, drawn, machined and worked on without any special equipment. It can be printed, stamped, engraved, silk-screened. The stable qualities of this sheet permits perfect register when multi-colors are necessary. It will resist most chemical and physical changes that occur in normal product use. Some of the many applications it can be used for are:

Advertising Displays
Advertising Specialties
Dials—Window Faces
Instruments

Maps
Name Plates
Signs
Templates

Three-Dimensional Signs
Trays (Jewelry Cases)
Electro Molds
Color Separation Plates

Samples of Colors and Gauges Will Be Sent On Request. All Sizes and Colors Listed Below Carried In Stock.

Schedule of prices listed below entitles you to assorted colors without extra charges.

Vinylite^{TRADE MARK} Plastic Rigid Sheets . . . For Immediate Delivery

ALL SHEETS PRESS POLISHED BOTH SIDES

STOCK }	RED	WHITE	BLACK	ORANGE	YELLOW	CLEAR
COLORS	BLUE	GREEN	IVORY	BROWN	MAROON	

SHEET THICKNESS	SHEET SIZES	SQUARE INCHES	1 to 24 SHEETS	25 to 49 SHEETS	50 to 199 SHEETS	200 to 999 SHEETS
.010	20 x 50"	1,000	\$1.20	\$1.05	\$.97	\$.93
.015	20 x 50"	1,000	1.64	1.43	1.32	1.27
.020	20 x 50"	1,000	1.94	1.69	1.55	1.50
.025	20 x 50"	1,000	2.34	2.04	1.87	1.81
.030	20 x 50"	1,000	2.72	2.38	2.17	2.10

RE-CUTTING TO SMALLER SIZE—ADDITIONAL—ASK FOR QUOTATION

TERMS: NET — F.O.B. OUR PLANT

Plastic Binding Corporation

732 SHERMAN ST.
CHICAGO 5, ILL.

Originators of Plastic Binding in America

15 WEST 24th ST.
NEW YORK 10, N. Y.



It's more versatile than a chameleon

The flexibility of the MPM 1 1/2" extruder makes it a favorite for laboratory and production extruding.

When it comes to adaptability, the lowly chameleon is a piker compared to an MPM extruder. The chameleon's versatility is limited to altering its colors; with an MPM extruder not only can you change colors, but you can vary shapes and materials to fit your precise requirements, too.

Quick changeovers and a wide material-handling range have made MPM ex-

truders favorites in shops which frequently switch the products they are called on to extrude. MPM extruders purge themselves in record time, so color can follow color and material can follow material with minimum delay. MPM's unique safety diehead makes changing of dies a cinch.

Complete internal corrosion resistance, ample vari-speed drives, and the most

flexible heating and cooling system in the extrusion field give owners of MPM extruders assurance their machines will be capable of handling the new materials which are now being developed.

Before purchasing an extruder, you should give full consideration to the advantages MPM has to offer. We will gladly answer all of your questions. Write to us without delay.

California Representative:
WEST COAST PLASTICS DISTRIBUTORS, INC.
2325 Jesse Street, Los Angeles 23, Cal.



15 Union St., Lodi, N. J., U. S. A.
Cable Address: MODPLASEX



1. For high translucence. "Dutch Boy" Plumb-O-Sil C has a refractive index that closely coincides with that of vinyl chloride resin. That's why Plumb-O-Sil C assures highly translucent stocks for a wide variety of products.



2. For better color. "Dutch Boy" Plumb-O-Sil C stabilizer has no appreciable tinting strength. You get good stability in deep shades and vivid colors because Plumb-O-Sil C performs well with almost all dyes and pigment additions.

Stabilize your translucent vinyl stock

with "Dutch Boy"

PLUMB-O-SIL C



3. For easier dispersion. "Dutch Boy" Plumb-O-Sil C needs no pre-dispersion. You get heat stability with less work and trouble in processing.

If you have a special problem in stabilizing your translucent vinyl compounds, consult our technical staff. They will be glad to help you. Or write for additional information and technical data on "Dutch Boy" Plumb-O-Sil C.

"Dutch Boy" Stabilizers

PRODUCT	USE
TRIBASE (Tribasic Lead Sulphate)	Electrical and other compounds requiring high heat stability
TRIBASE E (Basic Lead Silicate Sulphate Complex)	Low volume cost insulation
DS-207 (Dibasic Lead Stearate)	Stabilizer-lubricant for sheeting, film, extrusion and molded compounds
PLUMB-O-SIL A (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored sheeting and upholstery stocks
PLUMB-O-SIL B (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored film, sheeting, belting
PLUMB-O-SIL C (Co-precipitate of Lead Orthosilicate and Silica Gel)	Highly translucent film and sheeting
DYTHAL (Di-basic Lead Phthalate)	General purpose stabilizer for heat and light. Good electrical properties
DYPHOS (Di-basic Lead Phosphite)	Outstanding for heat and light in all opaque stocks, including plastisols and organosols. Exceptional weathering characteristics
NORMASAL (Normal Lead Salicylate)	As stabilizer or co-stabilizer in vinyl flooring and other compounds requiring good light stability
BARINAC (Barium Ricinoleate)	Stabilizer-lubricant for clears

Dutch Boy
CHEMICALS



*Reg. U. S. Pat. Off.

NATIONAL LEAD COMPANY
111 Broadway, New York 6, N. Y.

Modern Plastics



with present equipment .

Yes, the fastest way to increase the productive capacity of your plant, is to install on your present injection molding machines — Watson-Stillman PREPLASTICIZERS.

Years away from the experimental stage, W-S modern PREPLASTICIZING Units are designed and built to mount right into position on present machines, and when installed, they give you the following advantages in your molding operations:

1. *Shorter Molding Cycles* . . . In many cases cycles can be cut one-third to one-half.
2. *Piece weight savings* in a great number of cases can be immediately realized.

3. *Better Moldings* . . . Because the material in the shooting cylinder is completely plasticized at the start of the injection stroke, injection pressures in most cases can be reduced fifty percent or more, resulting in strain-free moldings and less rejections.

4. *Thinner Sections possible* . . . Wherever warranted, thinner sections are obtainable by means of using maximum injection pressure on the plasticized material without the pressure restriction caused by the torpedo.

And . . . don't forget, WATSON-STILLMAN has been building PREPLASTICIZERS for years and offers a complete line of these units for all E-Series injection molding machines. Let us tell you more about them. Write today.



HYDRAULIC MACHINERY DIVISION

ROSELLE, NEW JERSEY

W-S "COMPLETELINE" — SHORTEST DISTANCE FROM PRODUCTION TO PROFIT

WATSON-STILLMAN

ESTABLISHED 1848

9-6-31

B & J

NO. $\frac{1}{2}$ T.D.

MATERIAL GRANULATOR

CAPACITY: 500 lbs. on hour
based on Polystyrene
scrap with $5/16$ " screen.

HORSEPOWER: $7\frac{1}{2}$

THROAT OPENING:

Regular - $5\frac{1}{2}$ " x 20"

Model 451 - 8" x 20"

FLOOR SPACE: 3' 8" x 3' 11"

WEIGHT: 1100 lbs.



SPECIAL DESIGN ADVANTAGES

Small floor space required but high
capacity

Available with large throat for material
that is difficult to feed

Convenient material collecting bin

Easily accessible for cleaning

**Your grinder source for every
individual plastic material cut-
ting requirement and capacity
(50 to 3,000 lbs. per hr.)—Ball
& Jewell, machine tool builders
since 1865, have always paced
the grinding needs of the plastics
industry. Send us your require-
ment specifications.**

Requires A Smaller Machine?

B & J STANDARD IDEAL

Throat opening: $3\frac{1}{2}$ " x 10"
or 6" x 10"

Horsepower: 2

Capacity: 250 lbs. on hour



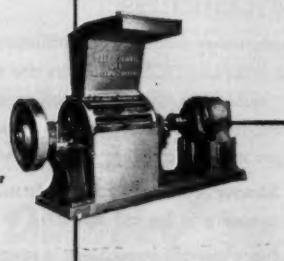
Requires A Larger Machine?

B & J No. 1 CUTTER

Throat opening: 7" x 24"

Horsepower: 10

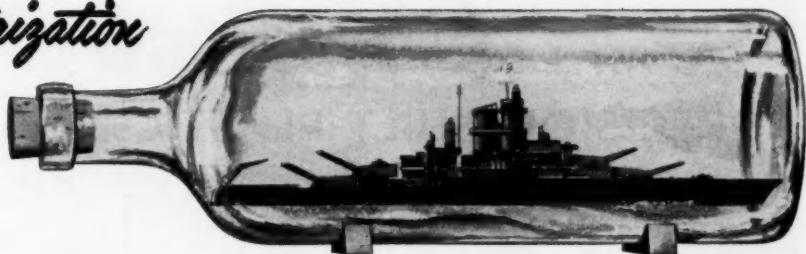
Capacity: 750 lbs. on hour



BALL & JEWELL, INC. Leadership Through Continuous Engineering Improvements

22 FRANKLIN STREET, BROOKLYN 22, NEW YORK

Miniaturization



Mighty Midgets in Plastics

For the newest important developments on the plastics front, look to the intensive miniaturization program underway in the electronics and communications fields. Working, in this case, through the vast resources of RCA, the program calls for intense miniaturization in size, and reduction in weight, of physical components. Idea, of course, is to produce smallest, lightest, assemblies possible—with greatly improved efficiency—for a scope of use impossible with unwieldy old equipment.

What a made-to-order spot for plastics! And for a moulder! The terminal boards, insulators, coil cases and covers (shown here actual size) have tolerances so close that in some instances, they are machined to final dimensions. There are wall sections as thin as .012". Inserts are fine Swiss screw

machine plated parts with exacting thread fits assembled to microscopic dimensions. Materials are low-loss mica-filled phenolics.

There's a production story here, too! With such necessary precision, commercial production was at first thought to be impossible. Within three weeks, we produced experimental tooling and a production method using compression and plunger techniques along with a combination of the two. *And then, carefully analyzing our experimental program, we designed and produced production tooling—and are now meeting production quotas and rigid inspection with commercial moulding methods!*

We can't offer you a better recommendation. For small parts—or large ones—we can put lots of experience at your disposal.

Kurz-Kasch, Inc. • 1415 South Broadway • Dayton 1, Ohio

Branch Sales Offices: New York, Lexington 2-6677 • Rochester, Hillside 4352
Chicago, Harrison 7-5473 • Detroit, Trinity 3-7050 • Philadelphia, Granite 2-7484
Dallas, Logan 1970 • Los Angeles, Richmond 7-5384 • St. Louis, Delmar 9577 • Toronto,
Riverdale 3511 • **Export Office:** 89 Broad Street, New York City, Bowling Green 9-7751.

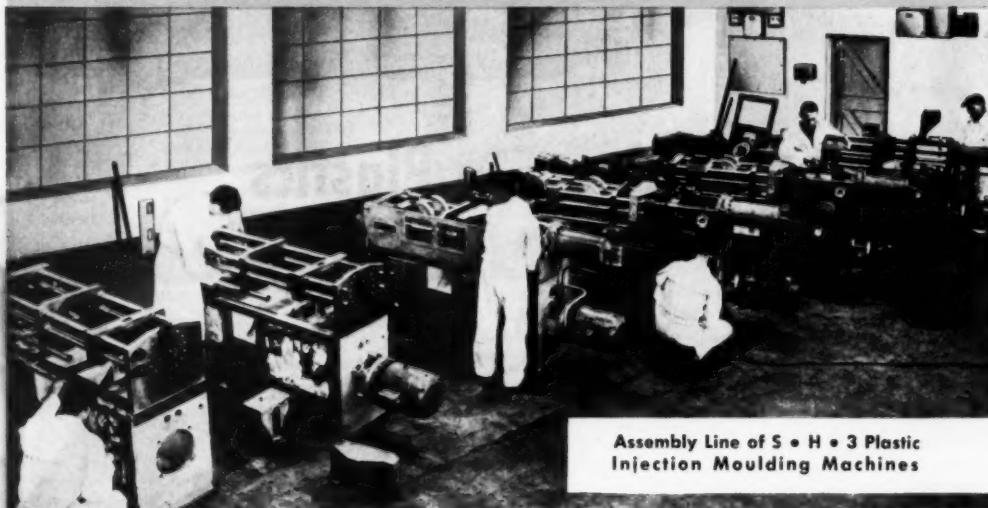


Kurz-Kasch

FOR OVER 36 YEARS PLANNERS AND MOULDERS IN PLASTICS

Windsor

PRECISION BUILT PLASTIC MACHINES



Assembly Line of S • H • 3 Plastic
Injection Moulding Machines

New Factory Extensions to meet World-Wide Demand...

To step up production in order to keep pace with delivery time schedules, R. H. Windsor Ltd. have just completed their new factory extensions at Chessington, Surrey, England.

The growing demand throughout the world for their famous R. C. Series of multi-screw Extruder Compounds is because, unlike ordinary extruders, all three (65 lbs., 100 lbs., and 200 lbs.) are able to perform four separate functions . . . compounding, extruding, coloring and reclaiming scrap.

The R. C. 65 and the R. C. 100 employ two interpenetrating screws, but the high capacity R. C. 200—has three! Simple to operate—exceptionally versatile—low in operating costs and power consumption. Full details of each model sent on request.



R • C • 65
Extruder Compounder

The New R.C.65 Twin Screw Extruder. Average
output 65 Pounds per hour. Driven by a 5
Horse Power Variable Speed Motor.

Exclusive U.S.A. Representative (Extrusion)

F. J. STOKES MACHINE COMPANY
PHILADELPHIA 20, PENNSYLVANIA



All Enquiries for Injection Moulding Machines direct to:—

R. H. WINDSOR LTD. ROYAL LONDON HOUSE 16 FINSBURY SQ. LONDON E.C.2 ENGLAND

Head Office & Works LEATHERHEAD ROAD SOUTH CHESSINGTON SURREY ENGLAND

Phone MONarch 8722

Grams & Cables 'WINPLAS' SURBITON SURREY

World Distributors
of the
"CHANDOS"
Rotary Dryer
and Preheater

THE VERSATILE PLASTIC

No need to state the virtues of polystyrene. It is accepted all over the world for its versatility . . . its adaptability. At long last the designer has been given a moulding powder reasonably free from limitations.

No need either to state the virtues of Kleestron. Enough to say it is made by Kleemann's in their new factory at Welwyn Garden City and is being sold . . . and moulded . . . and praised all over the world.

O. & M. KLEEMANN LTD.

Address all enquiries to :
O. & M. KLEEMANN LIMITED
West Halkin House, West Halkin Street, London, S.W.1., England



RIGHT

on

the

button

Titanox titanium dioxide pigments help give that smart, jaunty, dressed-up appearance to dress and suit buttons that makes them so right for today's fashions. Titanox white pigments not only lighten and brighten plastic buttons, but help maintain their "brand new" look throughout the life of the garment.

So it is with thousands of plastic products that get new life, color and sparkle from Titanox titanium dioxide pigments. If you're selling plastic on *appearance*, there's just no substitute for Titanox.

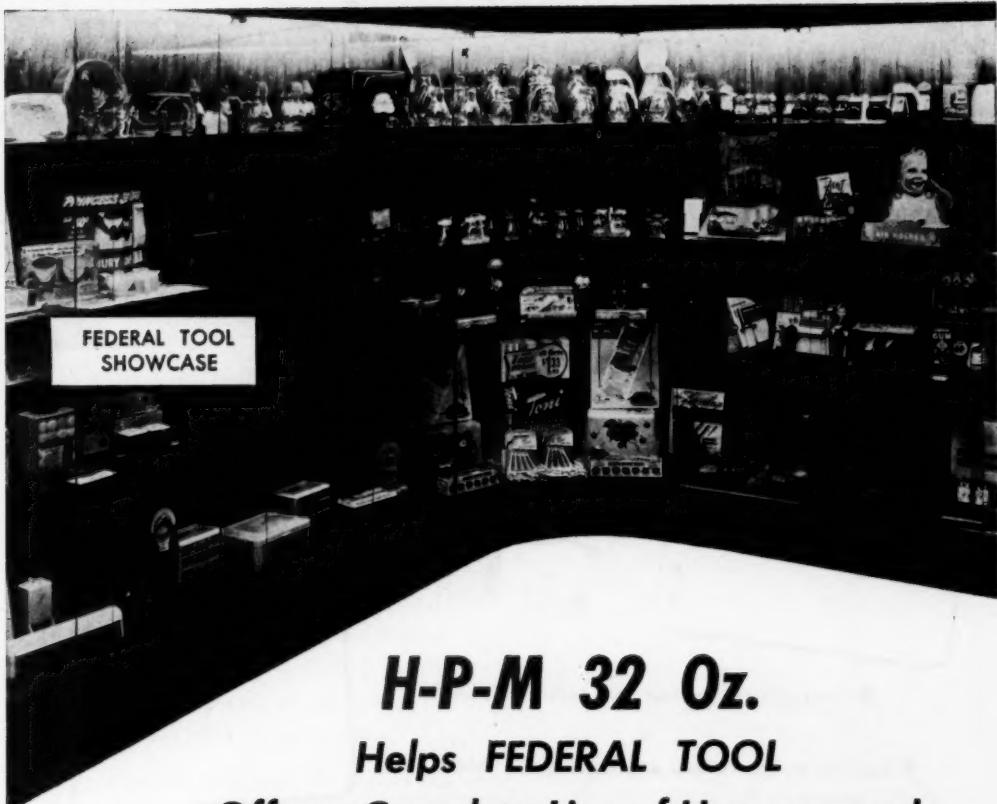
Our Technical Service Department is always available for assistance in the pigmentation of your plastics. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

989

TITANOX
the brightest name in pigments

**TITANIUM PIGMENT
CORPORATION**
Subsidiary of NATIONAL LEAD COMPANY





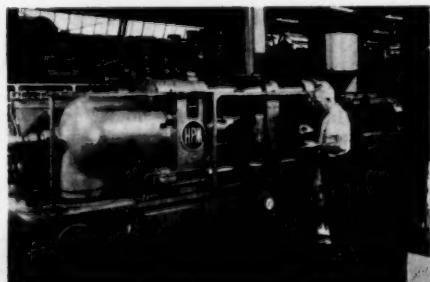
H-P-M 32 Oz.

Helps **FEDERAL TOOL**
Offer a Complete Line of Housewares!

In the housewares line, as in many others, the molder who is in a position to compete most favorably is the molder who is in a position to offer a complete line. For many molders starting out with 4, 9 and 16 oz. machines, expansion is now in the picture. And, the next logical step is the new H-P-M 32!

Look to H-P-M's new 32 oz. injection molding machine for the design features you want most—high capacity heat chamber with long-life calrod heaters . . . plenty of daylight for mounting molds . . . long stroke, fast-acting straight hydraulic mold clamp with adjustable slow down . . . retractable injection unit with hydraulic nozzle loading . . . hydraulic pumps and valves mounted in the open for easy accessibility.

Look to H-P-M's new 32 for your answer to more profitable, high production of bigger parts—the machine ideally suited to be the next logical step in your expansion program. Write for specifications today.



This H-P-M 32 oz. is one of several H-P-M
 Injection Molding Machines installed at
 Federal Tool Corporation, Chicago.

THE HYDRAULIC PRESS MFG. CO.

1010 MARION RD., MT. GILEAD, OHIO, U. S. A.

May • 1952



PLASTICS MACHINES FOR EVERY MOLDING JOB



COMPRESSION

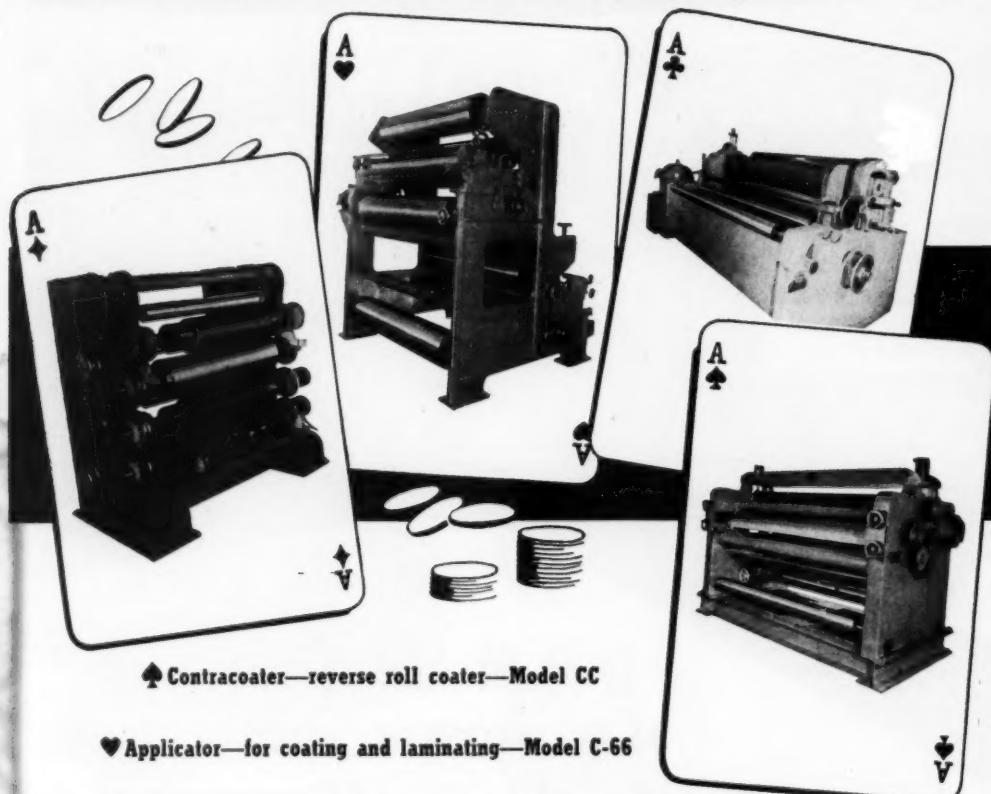


INJECTION



TRANSFER

"Aces High for Your Coating Operations!"



♦ Contracoater—reverse roll coater—Model CC

♥ Applicator—for coating and laminating—Model C-66

♦ Coater-Laminator—gravure and offset coater-laminator—Model 4 CL

♣ Waxer—wet and dry waxer—Model 2W

Write for full details on above coater equipment

DILTS MACHINE WORKS
Fulton, New York

SHARPLE BROS. MACHINE CO., Middletown, Ohio
Divisions of THE BLACK-CLAWSON CO., Hamilton, Ohio
Northern Sales Office: 814 N. Superior St., Appleton, Wisc.
Southern Sales Office: 937 Coventry Road, Decatur, Georgia
Western Sales Office: Mayer Building, Portland, Oregon
Associate: THE ALEXANDER FLECK LIMITED, Ottawa, Ontario
Subsidiary: B-C INTERNATIONAL LTD., Greener House,
66/68 Haymarket, London, S. W. 1, England

Dilts



COMPLETE COATING INSTALLATIONS

Manufacturers of phenolic thermosetting molding compounds and phenolic synthetic resins for the electrical, transportation, home appliance, paper and pulp, protective coating and foundry industries.

Dry granular phenolic thermosetting molding compounds are produced in blacks, browns, mottles and colors in general purpose, heat-resisting and medium impact grades. Special purpose molding compounds are produced to fulfill special molding requirements.

Synthetic resins are produced in dry, lump and finely ground particle size or in solution adaptable to customer's requirements. Technical service is extended and inquiries are invited.



PLASTICS ENGINEERING COMPANY

Sheboygan, Wisconsin

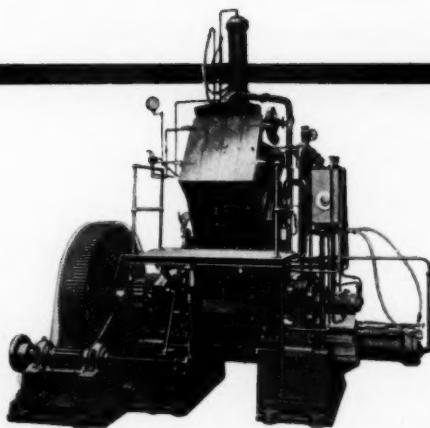
a really good mix up



In the middle of a traffic jam the other day, an interesting thought occurred. It is more than likely, we thought, that we had a hand in the production of the majority of the tires, paint work, distributor caps and other plastic electric components, bus driver's buttons, the bitumen and asphalt and so on and so on. The list was unending. Interesting, but not entirely remarkable, when we considered that most people with problems of breaking down and mixing natural and synthetic rubbers and blending plastics, paint, asphalt, bitumen and many other materials which require a variety of temperatures used the Shaw Intermix enclosed type mixing machine.

SHAW

INTERNAL MIXERS

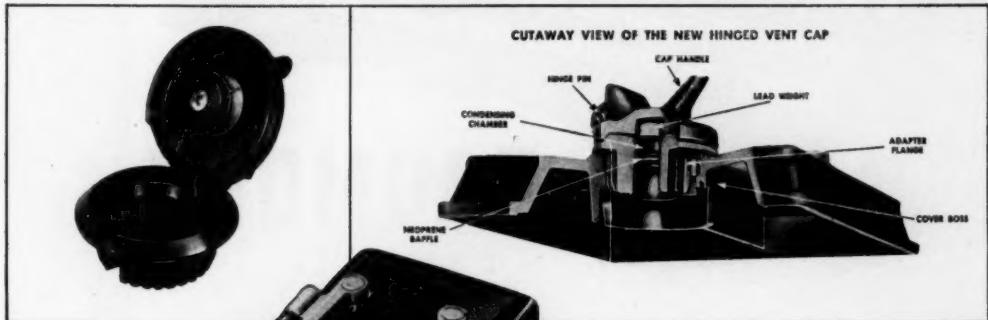


FRANCIS SHAW & CO LTD MANCHESTER 11 ENGLAND

Industry's headquarters for the best in Plastic and Rubber Machinery

Another adhesive problem solved with *Pliobond*

self-closing battery cap holds against shock, vibration, chemicals



PERMANENT BOND —
achieved in battery caps for
this railroad battery—thanks
to PLIOBOND.

IN assembling components of their self-closing battery vent cap for railroad car batteries, Gould-National Batteries turned to PLIOBOND to bond the hard rubber cap to the battery cover. Electrolyte doesn't attack the bond—and the fitting holds securely in spite of shock and vibration under the rail cars.

PLIOBOND — Goodyear's rubber-like thermoplastic adhesive that "bonds anything to anything"—has an ideal combination of flexibility and firmness for all applications where a permanent bond must withstand shock and impact.

Easily applied—always dependable—**PLIOBOND** is your best bet for both routine and unusual bonding applications. Ask a Goodyear Chemical Division Representative for details, or write:

Goodyear, Chemical Division
Akron 16, Ohio

GOOD YEAR

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

PLIOBOND—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Material Manufacturers— Plastic Compounds—Molders

GET THESE 8 COMBINED ADVANTAGES IN REDS AND
YEOWS FOR COLORING YOUR PLASTIC MATERIAL

**REDS and
YEOWS**

CADMOLITH

Glidden leadership in pigment research offers material manufacturers, compounders of new or old materials, plastic molders, or coaters a combination of advantages found in no other Red or Yellow pigments. These colorants, in Glidden CADMOLITH* Colors make your coloring job easier—give finest, most lasting colors in powders or plastic products made from them.

Specify Glidden CADMOLITH*
Gain these 8 Superior Properties . . .

- Soft, and Easy to Grind
- Insoluble in all Vehicles
- Alkali and Acid-Resistant
- High Heat Resistance
- Non-Fading to Light
- Non-Bleeding
- Wide Range of Shades
- Opaque

SEND FOR THIS FOLDER giving complete details, with color chips. Write The Glidden Company, Chemical & Pigment Company Division, Union Commerce Building, Cleveland 14, Ohio.

*Trade Mark Registered

SUNOLITH®
Lithopone

ZOPAQUE®
Titanium Dioxide



TITANOLITH®
Titania-tinted Lithopone

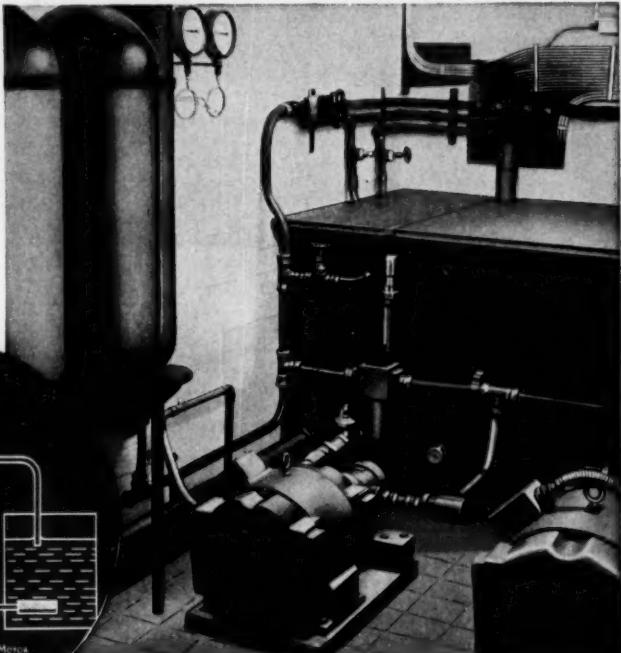
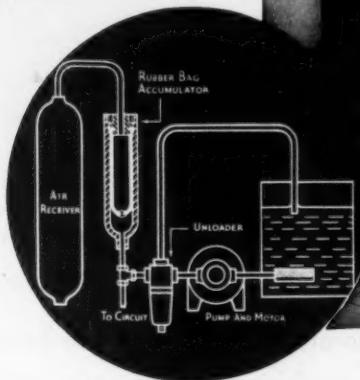


Dollar-Saving Drive

FOR WORLD'S BEST AUTO-CONTROL PRESSES

The BIPEL system of hydraulic drive is unique. It is based primarily on two novel BIPEL devices — a dual ratio (2:1 and 3:1) hydraulic intensifier on the press; and an automatic unloading valve which enables a simple fixed delivery vane pump to be combined with a gas-loaded accumulator. Pressure is generated at the highly economic figure of 1,000 p.s.i.

This medium-pressure-plus-intensifier system provides for the first time three pressures from a single source.



A typical BIPEL drive unit. This is one of four units installed in a single, space-saving underground chamber. A combination of any three of the four units can drive the forty presses installed.

The BIPEL drive system offers a combination of advantages that no other system can offer. It provides a compact, reliable source of hydraulic motive power, cheaper than any other to buy and operate. And, for the first time, it enables a down-stroking prefiller press to provide, from a single supply source, a choice of three molding pressures at will — the initial line pressure followed by intensified pressures of two or three times that figure.

The maximum advantage is derived when the equipment is installed as a group drive feeding a number of presses, up to ten or twelve. Or, as a built-in unit operating a single press, it has many advantages over conventional high-pressure pumps; it still remains simpler and cheaper, requiring less installed H.P. to drive and retaining the feature of three operative pressures.

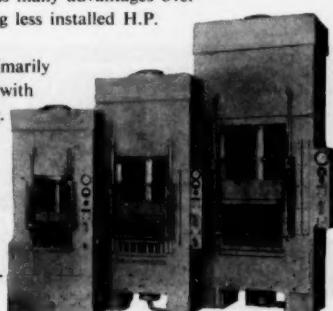
The BIPEL system, whilst also applicable to manually operated presses, is primarily designed for auto-control which enables the press to reproduce automatically with unvarying precision, any conceivable molding cycle including dwelling and breathing.

BIPEL presses are made in three models, each affording three molding pressures.

TYPE 40: 20, 40, 60 TONS

TYPE 100: 50, 100, 150 TONS

TYPE 200: 100, 200, 300 TONS



B.I.P. ENGINEERING LTD., ALDRIDGE ROAD, STREETLY, STAFFS., ENGLAND



PLASTICS FOR INDUSTRY

CRUVER is proud to again have a part in Philco's 1952 Refrigerator program.

Illustrated above are handle inserts, decorated by CRUVER's "Bas-Relief" process. In addition to our decorative facilities for nameplates, escutcheons, etc., we have press capacity up to 60-ounces for large plastic components such as evaporator doors, trays, breaker strips, etc. These large pieces can also be decorated in standard lacquers and bright finish. Let CRUVER do the entire job for you—castings, painting, and assembly.

CRUVER

Manufacturing Company

2460 W. JACKSON BLVD.

MOLDING • FABRICATING • LAMINATING • FINISHING



CHICAGO 12, ILLINOIS

"BAS RELIEF" DECORATING • ASSEMBLY • SPRAYING

Branch Offices: DAYTON • DETROIT • MINNEAPOLIS • NEW YORK • PHILADELPHIA • SYRACUSE



FOR
VINYL

available now
drums or carloads

There are many reasons why you should learn more about Monsanto's HB-40 and its applications as an extender-type plasticizer in processing vinyls. Some of these reasons are bull's-eyed above.

HB-40 has numerous uses—any of which may help you, either in terms of worthwhile savings or maintenance of product quality, or both. For instance—

VINYL EXTRUSIONS—Profile, tubing, belting and wire coating, both electrical and nonelectrical . . . **VINYL PASTES**—Organosols and plasti-sols, for fabric coating, free film, floor coverings and dip coatings . . . **VINYL SLUSH MOLDINGS**—Plas-

ti-sols for slush molding operations . . . **VINYL CALENDERING**—Thin film and sheeting, both supported and unsupported.

Write for test samples and try HB-40—please state proposed use. Ask also for Technical Bulletin P-104 . . . Contact any Monsanto District Sales Office, or write MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 South Second Street, St. Louis 4, Missouri.

* * *

DISTRICT SALES OFFICES:
Birmingham, Boston, Charlotte,
Chicago, Cincinnati, Cleveland,
Detroit, Los Angeles, New York,
Philadelphia, Portland, Ore., San
Francisco, Seattle. In Canada, Mon-
santo Canada Limited, Montreal.



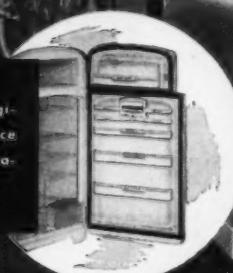
SERVING INDUSTRY . . . WHICH SERVES MANKIND

WORLD'S LARGEST EQUIPMENT BRINGS..

NEW HORIZONS IN PLASTICS

AMERICAN INDUSTRIES

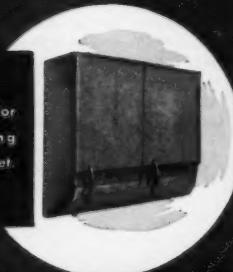
Ames and Admiral engineers teamed up to produce the first one-piece refrigerator door inner liner.



More than 3,700,000 new customers in 1951 for finer, lighter-weight plastic baby carriages.



Every home's a prospect for
chip-proof, non-fading
plastic kitchen wall cabinet.



Yesterday's dream--for example, the 14" x 20" refrigerator door liner--is today's accomplished product at home production at 7000s.

An endless variety of products in
your—lead the way to redesign for
Plastics. Thus achieving new
possibilities.

The logo for Amos Molded Plastics. It features the word "Amos" in a large, stylized, italicized script font. Below "Amos", the words "MOLDED PLASTICS" are written in a smaller, all-caps, sans-serif font, enclosed within a thin rectangular border.



A Case for PX Plasticizers

HAVE you seen the newest pieces of vinyl plastic luggage for women? They won't stain, chip or crack and they'll outwear and outlast natural materials. Some cases, like the smart looking ladies' gladstone at left, are made of heavy, unsupported vinyl sheeting. They have a flexibility that allows them to take years of punishment without showing it.

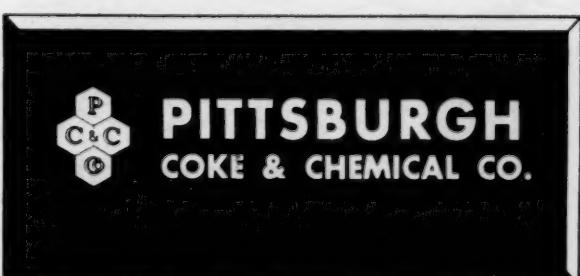
You can thank the *plasticizer* for that important property. And you can be doubly sure of good flexibility and permanence if the plasticizer is one of the broad family of quality-controlled Pittsburgh PX Plasticizers.

As a basic and integrated producer of coal chemicals we have the important advantage of being able to control the quality and uniformity of Pittsburgh Plasticizers from coal to finished product. And you benefit by consistent plasticizer performance . . . improved characteristics in your finished plastic products . . . and by dependable, continuing supplies. • We'll be glad to send you samples and specification sheets or provide you with any technical assistance you may need. *Write today!*

PX-104	DiButyl Phthalate
PX-108	DiIsooctyl Phthalate
PX-138	DiOctyl Phthalate
PX-208	DiIsooctyl Adipate
PX-238	DiOctyl Adipate
PX-404	DiButyl Sebacate
PX-408	DiIsooctyl Sebacate
PX-438	DiOctyl Sebacate
PX-658	TetraHydroFurfuryl Oleate
PX-917	TriCresyl Phosphate

WAD 4161

COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON



The NEW 20 OUNCE LESTER

*With Toggle Action Faster
Than Most 8 Oz. Machines*

Here is a 600 ton molding machine with *more rapid toggle action than most 8 ounce equipment*. This machine combines the features molders have talked about for years: fast toggle speed, high locking tonnage, and maximum plasticizing capacity.

Every one knows the fine record of the Lester 20 ounce machine — its spectacular toggle speed and its ability to hold difficult molds closed — perfect for molding tile. To the solid frame, rapid double toggle, and large die platens, we have added improved features of capacity, convenience, and accessibility: 33% MORE PLASTICIZING CAPACITY, INTERNALLY HEATED INJECTION CYLINDER OF THE LATEST AND MOST EFFICIENT DESIGN, 4-ZONE PYROMETER CONTROL, NARROW-BAND HEATERS, UNOBSTRUCTED AND ACCESSIBLE DIE SPACE, LARGE CENTRAL DIE ADJUSTING SCREW, AND EXPOSED HYDRAULICS FOR EASY MAINTENANCE.

Complete specifications for the NEW 20 ounce Lester are available in a convenient file folder on request. For competitive injection molding, you can't beat a Lester!

*Write for free Copy
of the Lester Press*



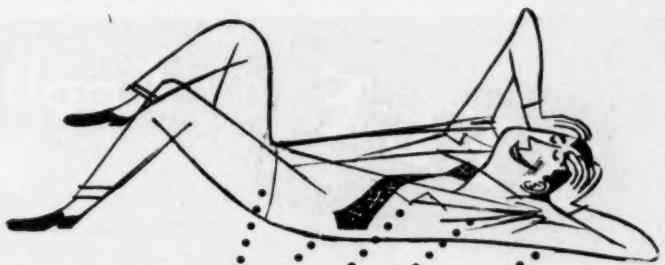
ESTER INJECTION MOLDING MACHINES
distributed by LESTER-PHOENIX, INC., 2621 CHURCH AVENUE • CLEVELAND 13, OHIO

REPRESENTATIVES

New York Steven F. Krould
Detroit Thorsson-McCosh
Chicago J. J. Schmidt
Cleveland Dan Williams
Cincinnati Index Machinery Corp.

Los Angeles . . . Seaboard Machinery Co.
New England . . . Sydney W. Lehman
San Francisco J. Fraser Roe
St. Louis, Milwaukee A. B. Geers

FOREIGN
Toronto, Canada . . . Modern Tool Works, Ltd.
London, England . . . Dowding & Doll, Ltd.
Calcutta, India . . . Francis Klein & Co., Ltd.
Sydney, Australia . . . Scott & Holliday, Ltd.
Japan, New York . . . W. M. Howitt, Inc.



now comfort comes in a cabinet molded by GENERAL AMERICAN!

One-piece compression molding for this air conditioning cabinet . . . A large cavity, deep draw phenolic molding. Molded on a 2000 ton compression press, just one of the General American battery of presses that range from 100 tons to 2000 tons.

featuring Beauty . . . The cabinet looks beautiful and is produced at moderate cost. It's sleek, colorful and pleasant to the touch. Resistant to commercial solvents, it retains the rich surface luster with age. A cabinet worthy of the finest home or the best appointed office.

and Utility . . . The cabinet does its job well. In some cases far better than the previous material used. At present it's being produced for one of the largest air conditioning manufacturers in the country. Its dimensional and heat stability assure exact fit between joining members.

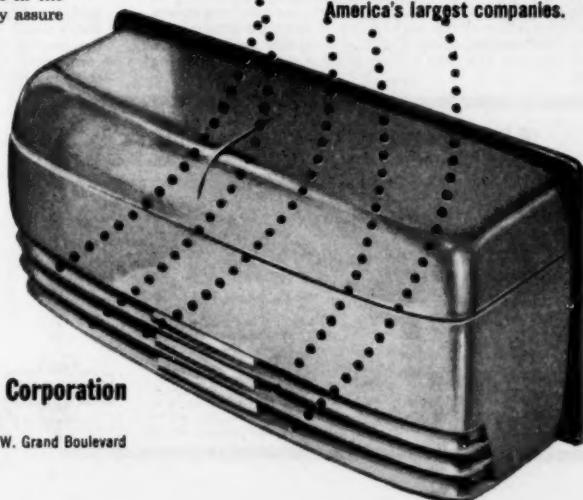
and from a technical viewpoint . . . General American has pioneered development of plastic cabinets (television, radio, etc.) and housings of far greater weight and size than any before considered practical. General American offers "large parts" users unduplicated facilities . . . and the ingenious engineering which has made this equipment perform exceptional work. More important, this combination has enabled many manufacturers to cut expenses sharply with the introduction of new plastics applications. Why not find out more about General American's facilities? There's a new brochure waiting for you. Just write and ask for it.

General American has had more than 50 years of successful experience in manufacturing for America's largest companies.



Plastics Division General American Transportation Corporation

135 South La Salle Street, Chicago 90, Illinois
New York 17: 10 E. 49th Street • Detroit 2: 2842 W. Grand Boulevard



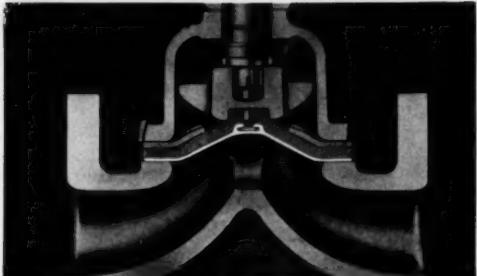
KEL-F

Application Report #1

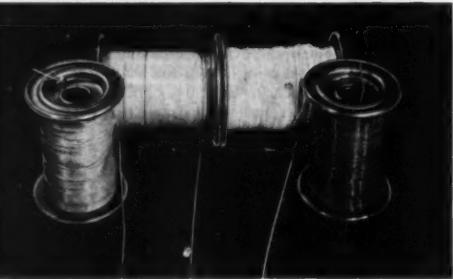
How Kel-F® is being used to solve tough design problems



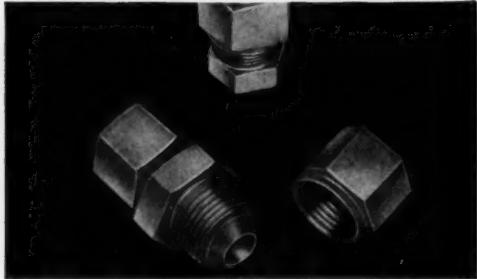
1. For these antenna bases, Kel-F's properties of zero moisture absorption and high electrical resistance immediately suggested it as a desirable material. However, its final selection was deemed mandatory because Kel-F could be injection molded around a metal insert, thus providing a completely hermetical seal.



2. Diaphragm valves for acid handling dramatize several of Kel-F's basic values. Its use in this commercial valve points up Kel-F's properties of low cold flow (good memory); chemical inertness; flexibility; and wide temperature range. Again however, the fact the Kel-F could readily be compression molded around an insert was a determining factor in its use.



3. This electronic hookup wire is Kel-F insulated, capitalizing on the plastic's high temperature and high electrical resistance. In the production of this wire, Kel-F is extruded onto copper wire in conventional equipment. Commercially available from several sources, the wire comes in an assortment of keying colors.



4. Fittings for chemical equipment are excellent examples of the design values found in five of the principal properties of Kel-F: high chemical resistance; a wide temperature range; non-wetability; plus ease of molding and machining. These commercial fittings are made from extruded rod which is conventionally machined to final, close tolerance.

A Capsule Report on the Properties of KEL-F

- ★ Chemical Inertness
- ★ Wide temperature range —minus 320 F to 390 F
- ★ High electrical resistance
- ★ Low Cold Flow

Basic Kel-F Products Available

MOLDING POWDERS

Unplasticized
 #300 ... for high temperature service
 #270 ... for less severe temperatures
Plasticized (in either
 #300 or #270)
 P 20 ... with 20% plasticizer
 P 25 ... " 25% "
 P 30 ... " 30% "

DISPERSIONS

NW-25 flows readily at fusion temperatures
 N-1 High molecular weight
 OILS, WAXES and GREASES
 #1 Light Oil
 #3 Medium Oil
 #10 Heavy Oil
 #40 Waxy Oil (pour point 80-90 F)
 #150 Hard Wax at 70 F
 (Greases compounded to order)

Standard Fabricated Kel-F Materials and Parts Available from Commercial Sources

- Molded Sheets ★ Extruded and Molded Rod ★ Extruded Tubing
- Thin Film (extruded as lay-flat tubing)
- Gaskets ★ Washers ★ Valve Discs ★ "U" Packing
- "O" Rings ★ Kel-F coated Resilient-core "O" Rings
- Valve Diaphragms

Transformer Terminals ★ Rotary Electric Switches ★ Hook-up Wire

Electronic Terminals, Tube Bases and Coil Forms

For full information on various molders, extruders and fabricators of Kel-F products; also technical data on detailed properties, molding and application techniques — write.

Chemical Manufacturing Division

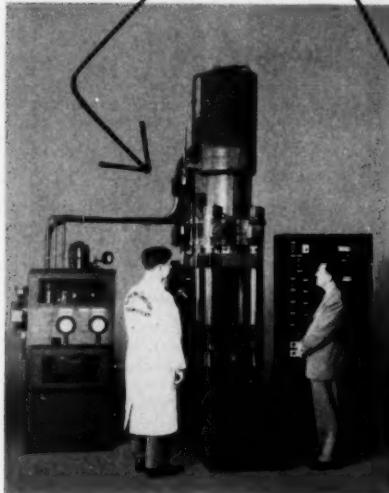
THE M. W. KELLOGG COMPANY

A SUBSIDIARY OF PULLMAN INCORPORATED
 P. O. Box 469, Jersey City 3, N. J.



6 oz

Jackson & Church pre-plasticizing press
cycles completely with
Polystyrene in 11 seconds!



J.C. 6 oz. press in actual operation. Electric relay panel is to the right, hydraulic unit on the left.

Four zone temperature control . . . complete plug-in of all electronic timers and relays . . . 200 ton clamping pressure . . . just a few of the engineering advances now available to the plastics molding industry with the new J-C 6 oz. press.

Designed for single or battery installation, the J-C 6 oz. pre-plasticizing press has all the advantages of larger J-C pre-plasticizing presses utilizing the Hendry Process*.

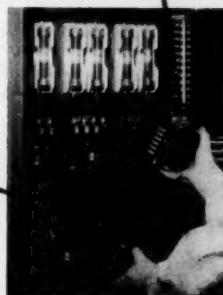
The electrically-driven extruder of the pre-plasticizing unit works independently of the press' hydraulic system to make possible the separate operation of both systems. Colors and compounds all thermoplastics. The pressure loading of the injection chamber in conjunction with the nozzle block holds a constant stock density in the injection chamber.

The newest and smallest in J-C's famous line of pre-plasticizing presses, the 6 oz. press provides ease of maintenance and makes possible great savings in operation and valuable floor space.

*patent applied for



Electronic timing device being plugged in. Pinning arrangement makes it impossible for operator to insert relay in wrong plug.



Close-up of electric master panel. Represents the latest in electronic advancements. Provides quick, easy replacement of component parts and new ease in trouble shooting.



A PRODUCT OF
JACKSON & CHURCH CO. • SAGINAW, MICHIGAN
WORK WELL DONE SINCE '51

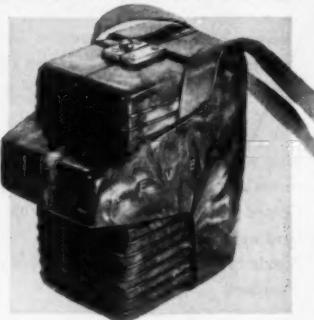
All Operations Under One Roof!

TO SAVE YOU
TIME, EFFORT and MONEY
in PRECISION
PLASTIC MOLDING
UP TO 200-OZ. SHOTS

Here are just two of the wide variety of items produced at Victory's modern, all-inclusive plant . . .

Camera Case for Revere •

3 separate plastic parts: front, back, swivel. 2 press-fit hinge rods. Locking mechanism secured with 4 insets. Raised letters with rolled gold finish. Color blend of plastics to produce a special color effect. Plastic carrying strap heat-sealed over specially designed boss.



Kelvinator Crisper Tray •



Extra-large (13½" x 24½") for use as double shelf. Also acts as crisper cover. Molded with deep slide undercuts. Absolutely flat—no warping. Made in several sizes. Photo shows bottom construction.

66,000
Square feet..

at your service.
Put Victory's complete
facilities to work for you . . .

ENGINEERING

Victory's staff of engineers includes specialists in the mechanical, electrical, electronics and chemical fields.

MOLD MAKING

Victory's complete and modern tool room is supervised by men with over 30 years' "Know-How" specializing in injection molds.

INJECTION MOLDING

Victory's ultra-modern, high-speed equipment, newly expanded production facilities, and competent use of controlled molding techniques assure top quality.

ASSEMBLY

Victory's conveyor line operation guarantees top speed and economy on plastics as well as the most complex electro-mechanical assemblies.

FINISHING

Victory's up-to-date automatic paint spraying, hot stamping, silk screening and printing equipment gives you custom-finish jobs at production line prices.

ATTENTION: SALES ORGANIZATIONS

Victory will manufacture and package your product, individually and in multiple-unit cases, preparing it for immediate shipment to your customers.



LET US HELP YOU WITH YOUR THINKING • CONTACT US NOW!

Victory
of CHICAGO

Victory Manufacturing Company

1726 WEST ARCADE PLACE • CHICAGO 12, ILLINOIS

ESTABLISHED IN 1930

Our Quick, Personal Service Cuts Red Tape,
Gets the Job Done Sooner!!!

NIXON V/L

RIGID
VINYL
PLASTIC

press polished sheets

calendered sheets

calendered rolls

sheets—rods—tubes

Nixon C/A (cellulose acetate)

Nixon C/N (cellulose nitrate)

Nixon E/C (ethyl cellulose)

Nixon C/A/B (cellulose acetate butyrate)

NIXON NITRATION WORKS

Founded 1898 NIXON • NEW JERSEY

Home Office: NIXON, NEW JERSEY

M. BREITKOPF
C. E. O'NEAL
E. W. LINDAHL
MRS. M. FAHRINGER
510 North Dearborn Avenue
Phone: Michigan 2-2363

W. H. SAVAGE

K. P. WHITING

CHICAGO, ILL.

E. L. PERRY

MRS. M. FAHRINGER

Phone: Michigan 2-2363

W. A. OLSEN

G. J. FELTZ

ST. LOUIS, Mo.

C. B. JUDSON

3687 Market St.

Phone: Lucas 3082

W. G. TUCKER

S. MAON

ST. LOUIS, Mo.

C. B. JUDSON

3687 Market St.

Phone: Lucas 3082

Phone: New Brunswick 2-1121

New York Extension WOrth 1-5290

NEW ENGLAND

Box 214

A. E. PERRY CO.

A. E. PERRY

J. A. DOVIDIO

Toronto 26, Ont., Canada

Canadian Distributor: Crystal Glass & Plastics, Ltd., 130 Queens Quay E., Toronto, Ontario, Canada

Another new development in AMERICAN ANODE materials



In your hands this can mean new sales!

New, controlled "plastic putty" with a whole list of advantages!

THIS new American Anode material — Ameran CV-G (controlled viscosity gel) — can open up new sales fields for you. It can help you develop new products, or improve present ones or methods.

Putty-like in form, it is a controlled viscosity "gel" that can be

hand-molded like modeling clay. No warm-up or heating is required. Articles are fused *after* removal from the mold — leaving the mold ready for immediate re-use.

Check these additional advantages: Besides cold dipping and molding, Ameran CV-G can be cast, extruded or spread. It resists oils,

greases, most acids and chemicals. Its viscosity is controlled — does not change in storage. No solvents are needed, eliminating fire hazard. It can be compounded in a wide range of colors, including white.

You'll think of many sales-making uses for Ameran CV-G. We'll be glad to help you with technical advice — samples if desired. Write Dept. AC-3, American Anode, 60 Cherry Street, Akron, Ohio.

AMERICAN ANODE

A Division of The B. F. Goodrich Company

CRUDE AND AMERICAN RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS,
AMERAN RESIN PASTES, COMPLETE MANUFACTURING FACILITIES



**NRM'S EXCLUSIVE
DIE GATE AND FRONT FLANGE
ASSEMBLY GIVES YOU . . .**

- Better Nylon Extrusions
- Easier "Change-overs"
- Faster Screen and Die Changes

Simple, speedy, and safe . . . that's the die gate adapter—and, the removable front flange—on NRM's electrically heated extruders. Both are engineered to save you time, money, and effort. Both are designed to give you better extrusions through precise heat control.

Write, today
for more information on
all of the features of NRM
extruders. Write to the ex-
perts at NRM — builders
of the earliest and the
latest in plastics extrusion
equipment.

The die gate adapter carries exterior band heaters. It attaches to the flange with only two sturdy bolts. It swings open quickly and easily. It gives full access to the die, strainer plate, and screens. It greatly speeds changing and cleaning operations.

The split front flange is similarly heated. It takes both the standard die adapter gate and the standard crosshead. It is quickly and easily removed. Its removal permits the mounting of Nylon dies and crossheads and extra heaters directly on the cylinder face. This controlled heating eliminates critical heat losses and gives more uniform extrusions of Nylon.

NRM's unique die and front flange assembly is now available on its 1½", 2½", and 3½" electrically heated plastics extruders. It's an important feature. However, it is but one of the many NRM features designed to give you better extrusions at lower costs.

2024

NATIONAL RUBBER MACHINERY COMPANY

General Offices & Engineering Laboratories: Akron 8, Ohio

East: 1180 Raymond Blvd., Newark, N. J.

West: S. M. Kipp, Box 441, Pasadena 18, Cal.

Export: Omni Products Corporation, 460 Fourth Ave., New York 16, N. Y.

NRM

*Creative
Engineering*



TODAY: New color, style, and comfort in automobile interiors. This attractive and durable armrest cleverly combines plastics and foam rubber to fully exploit the advantages of each. The body of the unit is a sturdy one-piece shell, molded with Hercocel A . . . is light in weight, economical to produce, with scuff-proof through-and-through color that can't wear off.

DESIGNED TO SELL WITH **HERCOCEL**[®]

TOMORROW: Stylish and practical new components of many kinds, molded with Hercocel for the fast-growing transportation industry. Properly used, Hercocel provides the ideal *quality* plastic for mass-production needs, offering savings in manufacturing costs every step of the way. At the same time, it lends itself perfectly to designs offering new merchandising features and improved performance.

Our designer presents here, in sketch form, a number of ideas for new uses of Hercocel based on the armrest application shown above. They'll undoubtedly suggest many other new ways in which Hercocel can help your products to look better . . . serve better . . . sell *fast*!

When you plan to use Hercocel, all the Hercules services to the plastics industry, including design assistance, technical counsel, and the facilities of our laboratories, are at your service. We invite your inquiries.

HERCULES POWDER COMPANY

INCORPORATED

Cellulose Products Department, 916 Market Street, Wilmington 99, Delaware

Original designs for transportation seating and crutch pads by Sandberg-Ferar, Detroit, Michigan.

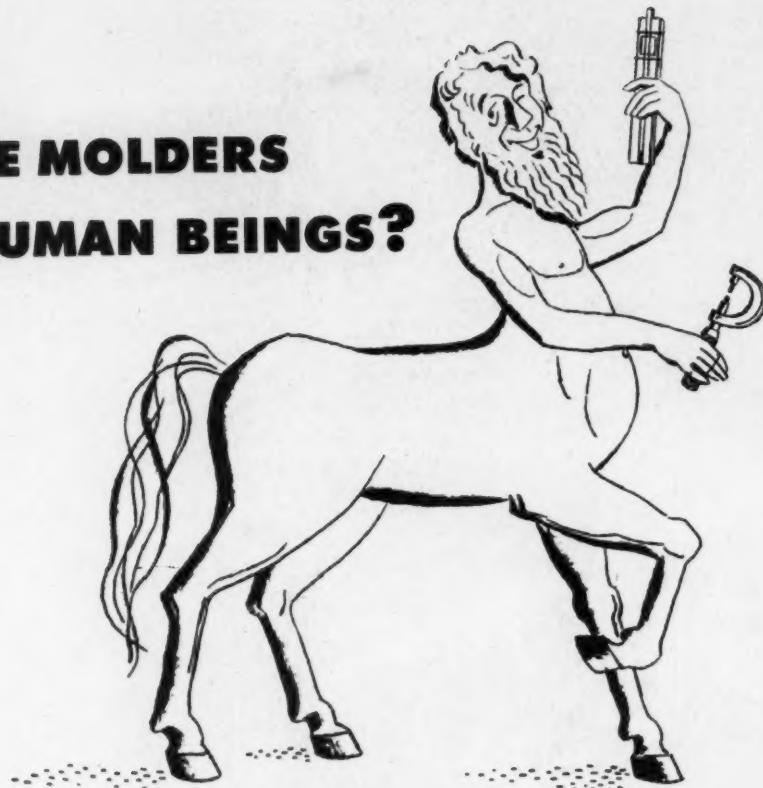
CRUTCH
PADS

BUS OR
AIRLINER
SEATS

SECTIONAL VIEW
OF HEADREST

HERCULES
CELLULOSE PLASTICS

ARE MOLDERS HUMAN BEINGS?



If you insist upon facts, we must admit deep doubt on this question. They wouldn't stay human long in this business.

The only affirmative clue is their tendency to make human errors. By this percentage do you judge their value to you.

In the past thirty years we have made our share — and we'll make more — but new ones, we hope.

Play the percentage — How about sharing the new ones with us. They won't be many.

May we bid on your plastic molding?



BOONTON MOLDING CO.

BOONTON, NEW JERSEY

NEW YORK OFFICE — CHANIN BUILDING, 122 EAST 42ND STREET, MURRAY HILL 6-8540

PUT YOUR PRODUCTION
CHIPS - ON A SURE THING

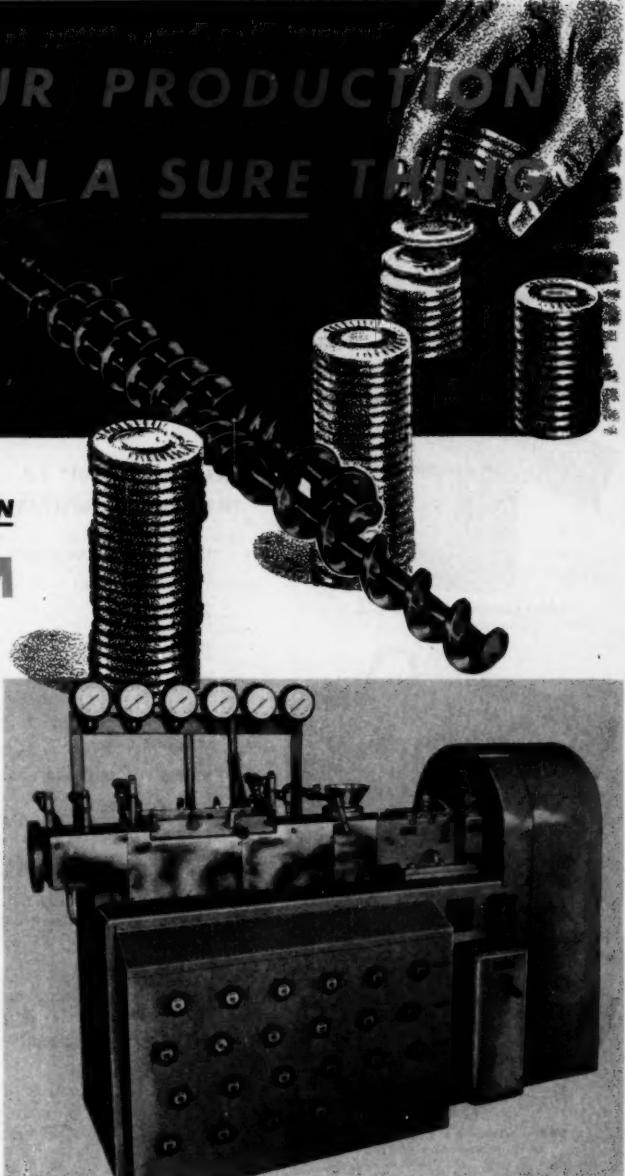
Welding Engineers PROVEN

DUAL WORM

*Compounder -
Extractor -
Extruder*

When you sit down to the table of competition, production-line efficiency is of paramount importance. It helps keep leaders on top... it helps make new leaders! That's why Welding Engineers equipment belongs on YOUR production line. It combines the economy of one-operation compounding-coloring-extracting-injecting-extruding with PROVEN DEPENDABILITY. It has such wide versatility in size and dual-worm combinations that it is really "Custom-Fitted" to your particular requirements—both present and future! Regardless of the nature of the materials you use, WELDING ENGINEERS equipment working for you means increased production with an absolute minimum of manpower, increased efficiency with reduced power consumption, increased profit potential. May we prove it to you?

*Patents Pending and Issued



**EXCLUSIVE Welding Engineers design features... counter-rotating dual worms, longer barrels, vacuum extraction, compact ruggedness and fast single-pass, continuous operation. There is a size for every need.*

Address your specific and unusual processing problems to

WELDING ENGINEERS, INC.
MORRISTOWN, PENNA.

PIONEERS IN THE DEVELOPMENT AND MANUFACTURE OF MACHINERY FOR THE PLASTIC INDUSTRY

You're going to hear a lot about

THE TOUGH, NEW, LOW-



RADIO CASING — economically produced in first run of only 10,000 units.



SUITCASE — realistic leather-like finish — combines light weight with tremendous impact resistance.



SINK — no absorption of food juices or clothing dyes. withstands scraping and dropping of cutlery and chinaware.

Just Look At What
You Can Do To Boltaron!

THERE'S NO LIMIT TO THE USES FOR BOLTARON!

- OFFICE MACHINE HOUSINGS
- TYPEWRITER CASES
- FENDER GUARDS
- TOTE BOXES
- CHAIR BOTTOMS
- SILVERWARE CASES
- LUGGAGE CASES
- LETTERS FOR OUTDOOR ADV.
- ICE CREAM LIDS
- DEEP FREEZE LIDS
- TRAYS (COMPARTMENT STYLE)
- AUTOMOBILE DOOR PANELS
- SEAT WINGS
- WELL COVERS
- COWL QUARTERS

Plus Hundreds of Other Uses



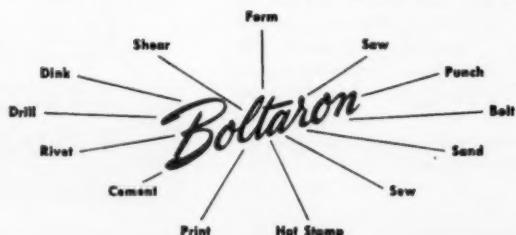
OFFICE MACHINE — tough, good-looking housing not affected by alcohol — nor stained by inks.



TOTE BOX — insures safety of fragile objects by accurate shape-forming. Shockproof and economical.



TELEVISION MASK — low-cost molds let fabricator keep pace with styling and design changes by producing accurate molds without expensive re-tooling.



Boltaron

PRESSURE FORMABLE SHEET

More than plastic! More than rubber! Boltaron (6100 Series) combines many of the advantages of both these versatile materials

Amazing Formability — Heat Boltaron sheet to approximately 300°F. Use low-cost molds of wood, metal, or composition — simple or complex shapes . . . low-pressure or vacuum forming equipment for shallow draws, simple plug and ring methods for deeper draws.

Tremendous Impact Resistance — A blow that will dent sheet metal or shatter metal castings will leave Boltaron unharmed. A Boltaron tote box can be dropped from a second-story window without injury.

Variety in Color, Size, and Thickness —

Boltaron can be produced in any color or shade, and in mirror, matte, and grained finishes. Colors won't scrape off because they are an integral part of the Boltaron sheet. Boltaron is available in standard sheets of 32" x 62" and 35" x 72", in thickness from 1/32" to 1/2".

Thorough technical service on Boltaron is ready for your use at the Bolta Engineering Laboratories.

Service and More Service — Bolta's designing and engineering staff, backed by many years of experience in the plastics field, is ready to work with you!

A special fabricating laboratory is in operation at the Bolta plant in Lawrence, Mass., for your benefit. Special molding and cutting techniques have been developed.

All this engineering is available to you so that you can make the most efficient use of Boltaron. If you do not do your own fabricating, Bolta can give you the name of a qualified fabricator in your vicinity.

Let us answer your problem — Write for illustrated brochure: Department 310, BOLTA, Lawrence, Massachusetts.

BOLTARON (6100 SERIES)					
GENERAL SPECIFICATIONS OF STANDARD STOCKS (Special BOLTARON available on request)					
PROPERTY	Temp. °F.	Value	CHEMICAL RESISTANCE:	Temp. °F.	Value
Specific Gravity	70	1.10-1.20	Water Absorption (24 hr. immersion)	70	0.5
Rockwell Hardness "J"	70	28	10% Sulfuric Acid (7 days)	70	0.3
% Elongation at Rupture	70	40	5% Sulfuric Acid (7 days)	70	0.5
% Elongation at Maximum Tensile	70	3	10% Sodium Hydroxide	70	0.3
Ultimate Strength — Tension (p.s.i.)	70	4400	1% Sodium Hydroxide	70	0.5
Young's Modulus in Tension	70	250,000	95% Alcohol	70	3.3
Impact Strength (izod)	70	15	Acetone	70	Soluble
(ft. lbs./in. notch)			Naphtha	70	1.8
(ft. lbs./in. notch)	20	4	10% Nitric Acid	70	0.5
(ft. lbs./in. notch)	0	1	10% Hydrochloric Acid	70	0.2

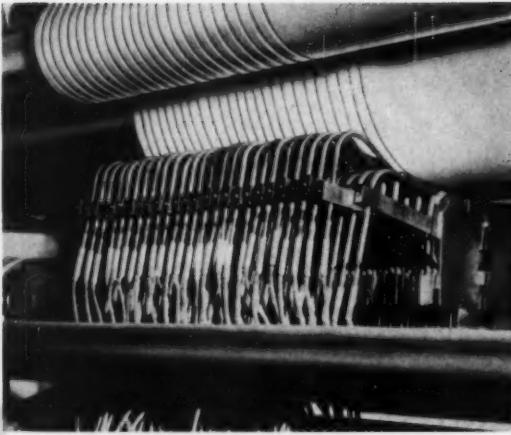
Specifications will vary as pigmentation and surface finish are changed

NEW! Boltaron 6200, a plastic of remarkable chemical resistance is available to you, exclusively through H. N. Hartwell & Son, 947 Park Square Bldg., Boston, Mass.

Boltaron

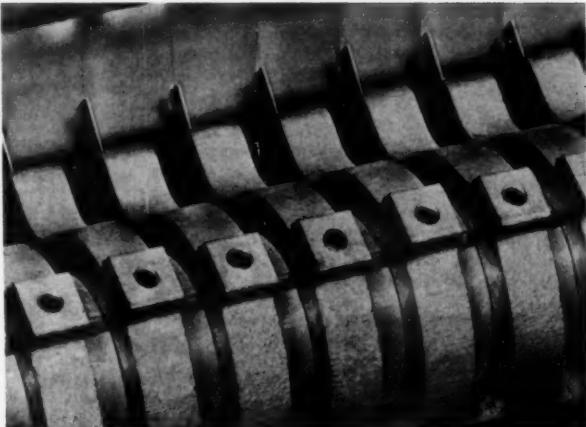
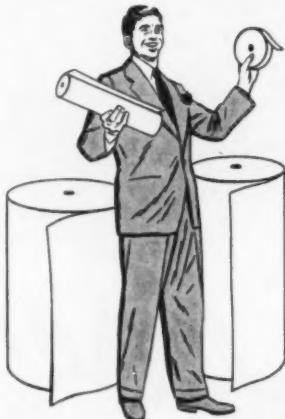
 BOLTA PRODUCTS SALES, INC.
 Lawrence, Massachusetts

Our Custom Molding Division specializes in injection and compression molding of all types. Write direct to this Division for full information.



FUSED EDGES on acetate rayon strip. The Camachine Sealcut electrically heated slitter-fuser attachment, used with a Camachine slitter-rewinder, fuses edges of the rayon strip as it is slit. No beading, no fused layers in the finished rolls. Write for Catalog Supplement 1010-B.

RAZOR BLADE slitting elements have proved successful for several types of plastic sheet and film. The Camachine razor blade attachment can be used as the main slitting element, or as an auxiliary attachment for high speed Camachines which are also equipped with standard score cut slitter units. Write for Catalog Supplement 1010-A.



IDEAS and Camachines go together. Here, at Cameron, is the greatest concentration of experience and ability that you'll find anywhere in the field of slitting and roll winding equipment. Why not find out what Camachine slitters and winders can do for you?

CAMERON MACHINE COMPANY • 61 Poplar Street • Brooklyn 2, N. Y.

LOOK FOR THE BEST WAY TO DO IT
AND YOU'LL WIND UP WITH

Camachines®

PLEXIGLAS... Another Reason Why

Lincoln for 1952 is so

Distinctive

New Lincoln tail light
lens is 10 1/4" high.
Injection molding of
PLEXIGLAS "V" Molding Powder by
Erie Resistor Corporation, Erie, Pa.

On 1952 Lincolns, big tail light lenses provide distinctive model identification and large-area tail-and-stop-light brilliance. They are molded of PLEXIGLAS because it is the material for parts requiring *functional beauty*.

PLEXIGLAS acrylic plastic parts have rich sparkling color, superior dimensional stability, and resistance to breakage, heat, and weather. That's why you'll find PLEXIGLAS used for a long list of molded parts throughout the automotive industry—lenses, medallions, instrument panels, hood and steering wheel ornaments, decorative bezels and escutcheons, speedometer, radio, clock and gauge dials.

Learn what PLEXIGLAS can do for *your* molded decorative and functional parts. Write for our booklet, PLEXIGLAS MOLDING POWDERS.

Detroit Representatives: W. E. Biggers and R. C. Ogleby, 728 Fisher Building, Detroit 2, Michigan. Telephone: Trinity 3-3200.

PLEXIGLAS is a trade-mark, Reg. U. S. Pat. Off. and other principal countries in the Western Hemisphere.

Canadian Distributor: Crystal Glass & Plastics, Ltd., 130 Queen's Quay at Jarvis St., Toronto, Ontario, Canada



CHEMICALS FOR INDUSTRY

**ROHM & HAAS
COMPANY**

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

NEW PHENOLIC

with minimum impact strength of 1.05 that can be automatically preformed*

low bulk
factor of 3.5:1

dustless

fast rate
of cure

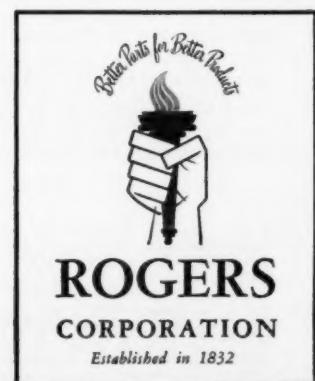
*1.05 ft. (min.) lbs./in. of notch

Here at last is a high impact phenolic molding compound that is almost as easy to preform and mold as general purpose materials. This new material, like other Rogers impact phenolics, is formulated specifically to facilitate high speed production of high strength molded parts.

Preforms can be made on standard tabletting machines and the "pills" are not only hard but can be held to close weight tolerances. This ready preformability of RX 431 permits electronic preheating when desired for improving electrical characteristics and shortening molding cycles.

Clean and dustless, this new material is pleasant as well as easy for personnel to handle. Its molded appearance rates as good.

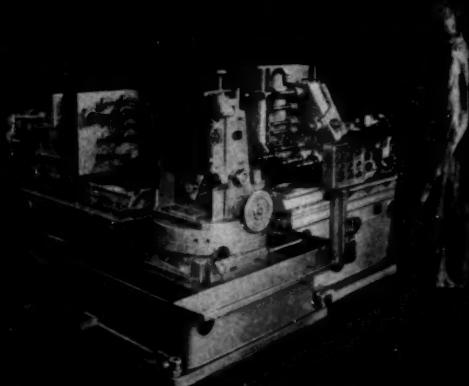
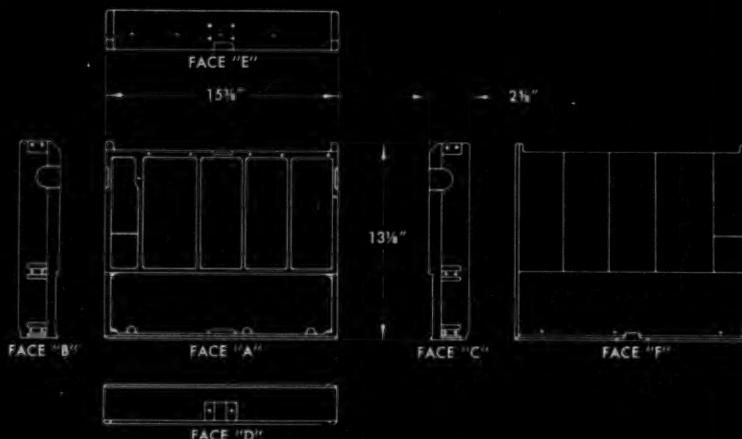
Complete specifications for RX 431 are available on request. Please write Dept. P, Rogers Corporation, Manchester, Conn.



NATCO High-Speed Sensitive 2-way Driller

machines holes from .098 to .199 in plastic cash register drawers

Drills 1600 holes in 6 faces automatically
to complete 50 drawers per hour



NATCO DRILLING, BORING,
TAPPING AND FACING MACHINES

Send us your drilling, boring, tapping or facing problems . . . our engineers have the solution. Also be sure to ask for NATCO "Success Story" No. 5.



Call a *Natco Field Engineer*

NATIONAL AUTOMATIC TOOL COMPANY, INC., Richmond, Ind., U. S. A.

Branch Offices: 1809 Engineering Bldg., Chicago • 409 New Central Bldg.,
Detroit • 1807 Elmwood Ave., Buffalo • 2902 Commerce Bldg., New York City

meet the



• Polycizer 332 AND 162

These two new plasticizers — POLYCIZER 332 and POLYCIZER 162 — can bring decided improvements to your vinyl and other synthetic resin and rubber products . . . They can help reduce production costs, too, by making it possible to use a lower plasticizer content or a higher filler load without impairing product quality.

POLYCIZER 332 (Dioctyl Adipate) is free from odor, is low in acidity and practically colorless. It is recommended for use either as an entire or partial plasticizer in calendering, molding, extruding, organosol and plastisol processes . . . POLYCIZER 162 (Dioctyl Phthalate) is also odorless, low in acid and practically colorless. It is recommended as an all-purpose plasticizer for use with all types of resins and rubbers.

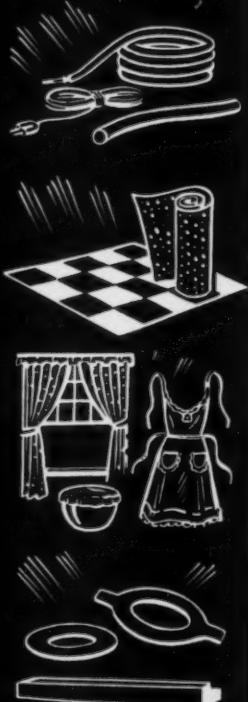
Write for complete data



HARWICK STANDARD CHEMICAL CO.

AKRON, OHIO

BRANCHES: BOSTON, TRENTON, CHICAGO, LOS ANGELES



IN NYLON ...to meet Defense Requirements

if you're contracting the supply of defense-essential molded parts, a Fellows Injection Molding Machine will save you time, money and material. The use of small molds cuts tooling time and cost. Material is saved because of the small sprues and runners.

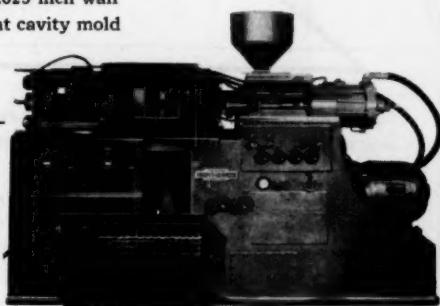
if you're going to mold in Nylon, a perfected narrow-limit temperature control for "non-drooling" cylinder performance gives Fellows machines a decided advantage.

if you're aiming for speed and economy in molding precision parts, consider the production time for these tiny 0.025 inch wall Nylon coil forms—2400 per hour from an eight cavity mold on a Fellows 'Speed-Flo' 1B-3-15.

if you want profit-making 'Speed-Flo' performance—on Nylon, styrene or acetates—get in touch with our nearest office. You'll be glad we suggested it.



Nylon output transformer coil forms for communication head sets. Molder, Thorgren Tool and Die Co., Valparaiso, Indiana.



Fellows Model 1B-3-15—
the 3-ounce machine for
precision or "hot molding."

Fellows

LEOMINSTER
injection molding equipment

THE FELLOWS GEAR SHAPER CO., Plastics Machine Div., Head Office & Export Dept., Springfield, Vt. Branch Offices: 323 Fisher Bldg., Detroit 2, 5635 West North Avenue, Chicago 39 • 2206 Empire State Bldg., New York 1 • New England Distributor: Leominster Tool Co., Leominster, Mass.

You saw this ad in *Tool Engineer*, *Machinery*, *Modern Machine Shop*, *American Machinist*, *Iron*...

and at **CRUCIBLE**
MOLD STEEL
is **TOOL STEEL**

Take our experience as tool steel leaders for more than 50 years — add it to the unique staff of mold steel specialists we maintain — and the result is *better* mold steel!

That's why Crucible mold steels are consistently chosen for most exacting molds. And why mold steel users are checking our strategically located warehouses for stocks to meet their needs.

Give us a call.



**WRITE TODAY FOR YOUR
TOOL STEEL SELECTOR**

Get your copy of the unique Crucible Tool Steel Selector — a quick twist of the dial gives you the right tool steel for the right job. And it will help you select mold steel! Selector has 9-inch diameter; printed in 3-colors.

CRUCIBLE

first name in special purpose steels

52 years of *Fine* steelmaking

MOLD STEEL

CRUCIBLE STEEL COMPANY OF AMERICA • TOOL STEEL SALES • SYRACUSE, N.Y.



*Molded right
for writing*

Our molding assignment for these Alexander pencils was to produce writing instruments properly balanced—smooth of line. Color specifications were carefully met—functional needs of the product were painstakingly watched.

This careful consideration of functional needs characterizes our production activity. First we determine whether or not plastics can do the best job for you. Then we make sure *in advance*, that the plastic material used will be *right* for your product. Our engineers and molders now go to work and create a plastic product that is *right* every way you look at it.

Right for appearance—*right* for stability—*right* for sales appeal.

We'd like to convince you in person that ours is the *right* molding service for you. Tell us about your plastic problems. You'll receive a speedy and, we believe, a helpful and profitable answer.



Write on your letterhead for the new Injection Molded and Extruded Plastics Catalog. Or, for detailed information about **CHICAGOPLAST***, piping, tubing and fittings, write for circulars containing data and illustrations. *Trade Mark Reg.

ELMER E. MILLS CORPORATION

INJECTION MOULDED and Extruded Thermo-Plastic Materials Including Cellulose Acetate, Cellulose Acetate Butyrate, Acrylates, Methacrylates, Styrenes, Vinyls, Vinylidene Chloride, ~~Chloroprene~~

2930 NORTH ASHLAND AVENUE • CHICAGO 13, ILLINOIS

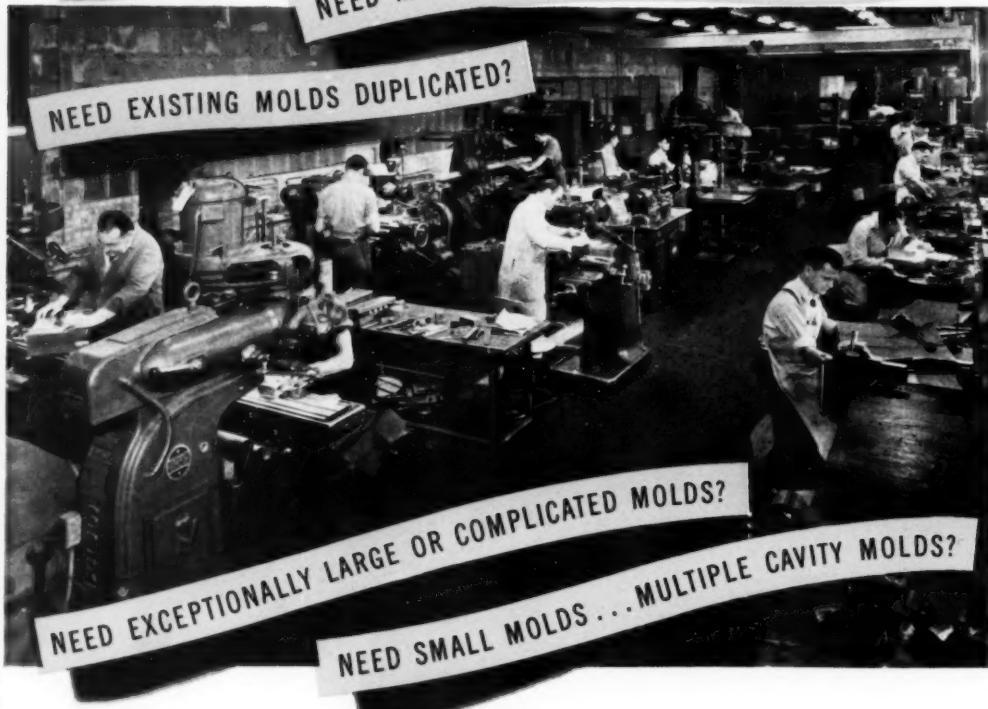
NEED ADDITIONAL MOLD-MAKING FACILITIES?

NEED MOLDS THAT POSE ENGINEERING PROBLEMS?

NEED EXISTING MOLDS DUPLICATED?

NEED EXCEPTIONALLY LARGE OR COMPLICATED MOLDS?

NEED SMALL MOLDS...MULTIPLE CAVITY MOLDS?



MPc will build your plastic molds

One of the industry's best equipped and most ably staffed tool rooms is yours to use, here at MPc. Here you will find advanced types of equipment operated by highly skilled craftsmen. These men and machines have solved many a challenging problem in mold design and fabrication...problems encountered while MPc paced the advance to ever-larger plastic castings. Here at MPc, unmatched facilities and an unparalleled fund of experience are available for designing and tooling your plastic molds. Write to MOLDED PRODUCTS CORPORATION, 4535 W. Harrison St., Chicago 24, Illinois.

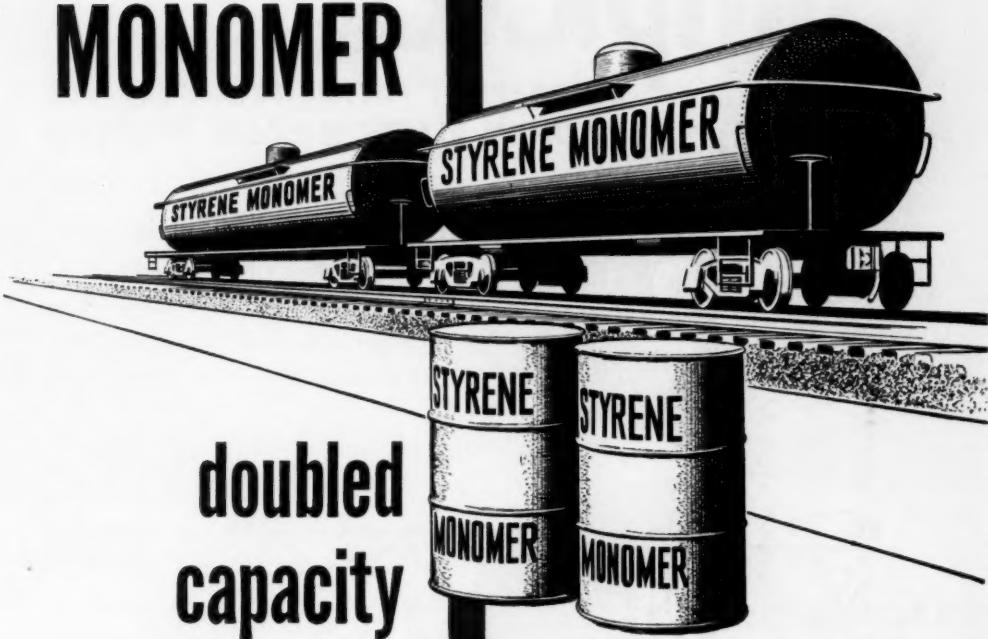
MOLD MAKING DIVISION
MOLDED PRODUCTS
...Pace-Makers in Plastics Molding

FREE "Data Book of MPc Facilities," an engineering-eye view of MPc press capacities and other production facilities... together with a survey of MPc special skills available for your use. Write for your copy.



STYRENE MONOMER

doubled
capacity



Increased production of styrene monomer by Monsanto in its expanded Texas City plant now makes available *double the quantity* of this reactive raw material . . . Made to rigid Monsanto standards, it provides a greatly enlarged source of monomer for the production of resins and copolymers.

Private industry's requirements can now be met from this increased tonnage, available in commercial and research quantities. Shipped in tank cars and in 55-gallon drums . . .

MONSANTO CHEMICAL COMPANY,
Texas Division, Texas City, Texas.

MANY USES . . . Monsanto styrene monomer is used in the production of polystyrene molding compounds; GR-S type synthetic rubber; styrene-butadiene emulsions for water-dispersible paints; styrenated oils for surface-coating resins; styrene-modified alkyds for air-drying and baking finishes; low-pressure laminating resins; styrene emulsions and copolymer emulsions for modifying properties of paper and textiles; ion exchange resins . . . Write for new Monsanto Styrene Monomer Technical Bulletin.

MONSANTO
CHEMICALS - PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

Complete

**BRIDGEPORT FACILITIES ASSURE YOU
MAXIMUM PLASTIC MOLDING EFFICIENCY**



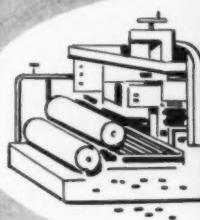
B rai ns

Everybody at Bridgeport Molded knows his job. *Everybody knows plastics!* We've been meeting the plastic requirements — big or small — of every type of business for many years.



M ethods

From die layouts to shipping room, we use only modern, efficient methods of design and manufacture. And we are always on the lookout for improved methods and ideas.



P roduction

When you combine the best in brain power with the best in machinery and methods, you get the best in finished plastic products. And that's exactly what happens at Bridgeport Molded Products.

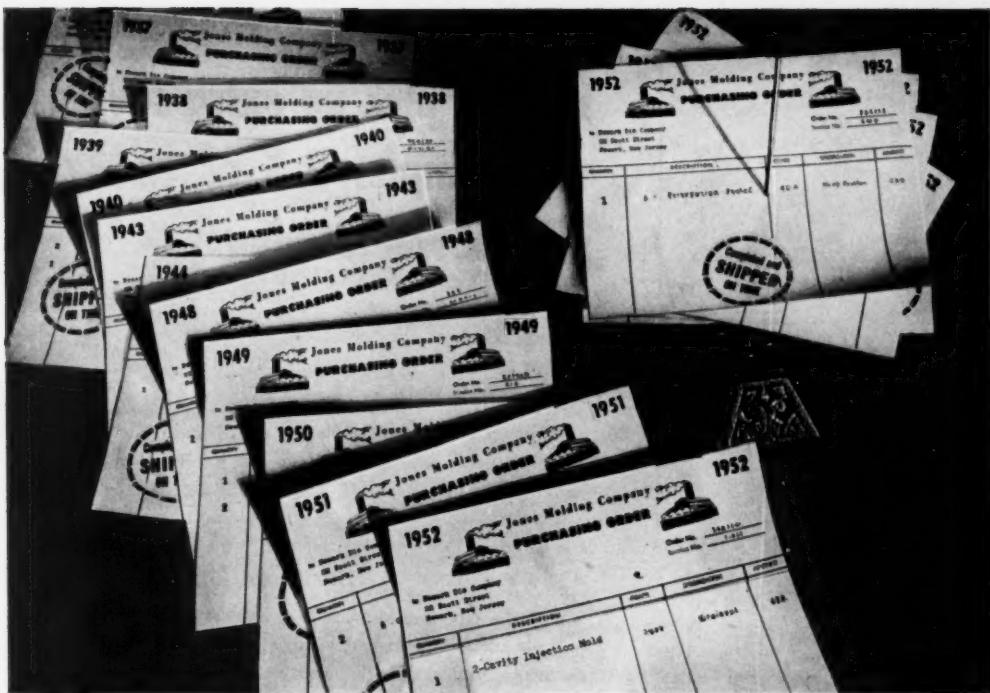
Write today for full details



Bridgeport Molded Products, Inc.

BOX 3276, BARNUM STATION

BRIDGEPORT, CONN.



Year after year...

NEWARK DIE CUSTOMERS* COME BACK

***MORE THAN
50%
OF THE
PRESENT
customers of Newark
Die have been
consistent customers
for 15 years or more**

When plastic molders *keep* on using the same mold supplier, it's because *they* know they can count on the molds to produce precision parts—and to stand up in service.

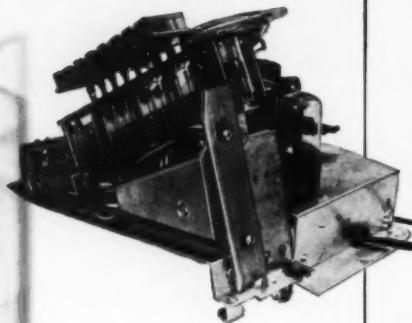
The quality of our molds has brought many *new* customers to Newark Die throughout the years. Even more important, we have *retained* the same *old* customers for years.

Our enlarged tool room facilities have enabled us to maintain our high standards of quality and to continuously give good service.

This man can show you . . .



How to pick up extra savings with simpler P-K assembly plus power driving



Portable electric drivers are used to speed assembly of this inter-office communication set, because mis-threading worries are eliminated. The 28 P-K Hex Head Type Z and Phillips Head Type Z Screws drive easily, set up securely, can be removed and replaced when necessary. Fastenings are made in 18 gauge CRS and aluminum die-casting.

Ask a P-K Assembly Engineer where you can take further advantage of power driving. Often, a switch to P-K Screws gives production a *double lift*. You save the time for needless tapping, bolting, riveting, or inserts in plastics. You also find that the *simpler* P-K method permits use of power driving to further speed assembly.

With the experience of more than a million applications to guide him, a P-K Assembly Engineer can quickly provide the answer to this, and other questions about making your assemblies better, faster, stronger, and at lower cost.

Today, more than ever, the P-K Assembly Engineer is a good man to have on your production team, helping you boost output and beat the squeeze on profits. He'll call at your request. Parker-Kalon Corporation, 200 Varick St., New York 14.



This Bulletin on Power Driving will help you determine which type is best for your work.

Describes and illustrates the various basic types of electric, air-operated and impact tools, as well as the automatic hopper-fed machines for screw driving in common use. Also useful information on proper bit and socket selection. Free on request. Ask for Form 401.



Your INDUSTRIAL SUPPLY DISTRIBUTOR . . .
your local source for P-K Screws . . . works side by side with the P-K Assembly Engineer. Their combined efforts are solving many difficult problems of planning and procurement. Let them help you.



PARKER-KALON®

The Original **SELF-TAPPING SCREWS**

FOR EVERY METAL AND PLASTIC ASSEMBLY



In Racing or Fabrics...
**It's the FINISH
that counts!**

Textile finishes have worked wonders in improving both the appearance and the utility of fabrics—and many of these improvements depend upon that reliable favorite, Heyden Formaldehyde, and its derivatives.

Finished with urea formaldehyde resins, rayons and cottons have taken on a new look combined with practical advantages of improved hand, wet-strength, and resistance to wear, shrinkage and wrinkling. Highest quality in these resins is assured with Heyden Formaldehyde, which is also preferred as a raw material for reducing agents, bright new dyes, and synthetic fibers.

The odds are on your product winding up in the winner's circle when you specify Heyden on your orders for formaldehyde, paraformaldehyde, or hexamethylenetetramine—all manufactured under rigid laboratory control from highest purity raw materials.

FORMALDEHYDE

37% by weight, minimum—N.F. or Methanol-Free.
Tank cars, tank trucks, drums, carboys or bottles.

PARAFORMALDEHYDE

An equally reliable solid form of formaldehyde.
U.S.P. X Powder, Flo Granules and Granules.

HEXAMETHYLENETETRAMINE

Source of anhydrous formaldehyde for resins, plastics, chemicals.
Technical and U.S.P., granular and powder.

• • •
Write now for samples for investigation.

HEYDEN CHEMICAL CORPORATION

393 Seventh Avenue, New York 1, N. Y.

CHICAGO • PHILADELPHIA • SAN FRANCISCO • DETROIT • PROVIDENCE

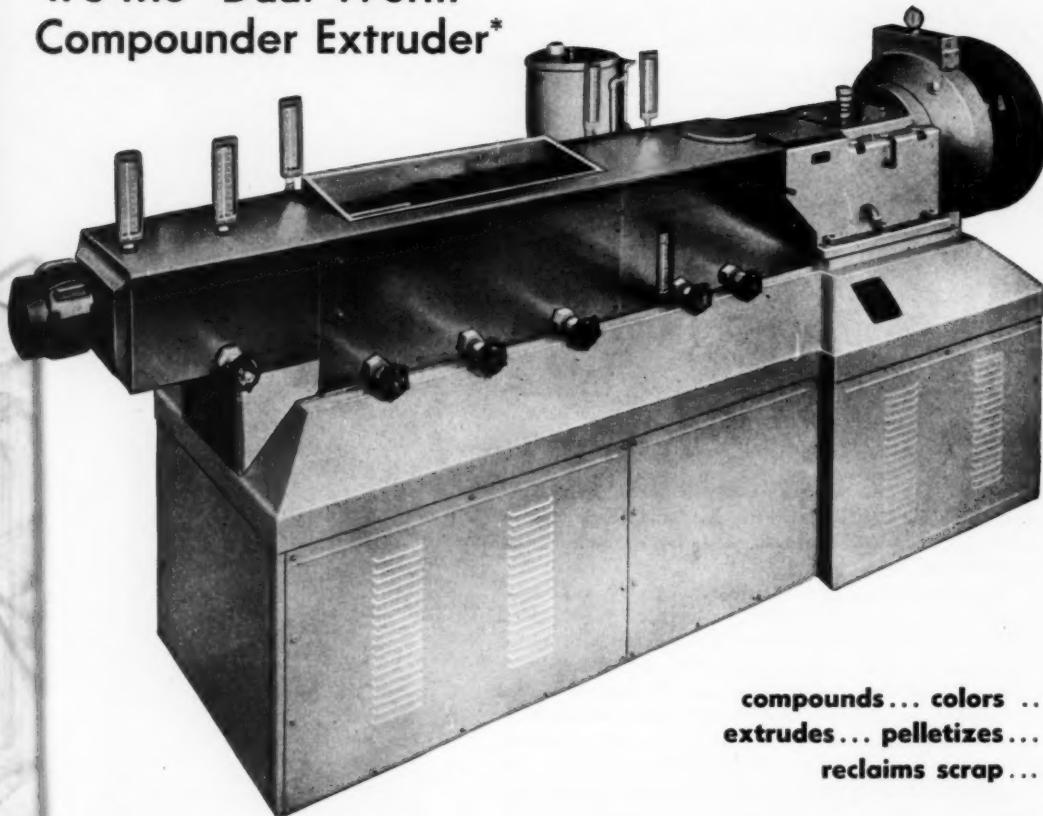


Serving Industry through Finer Chemicals

Benzaldehyde • Benzoates • Benzyl Chloride • Bromides
Chlorinated Aromatics • Crocosoles • Formaldehyde • Formic Acid
Glycerophosphates • Guaiacols • Hexamethylenetetramine
Medicinal Colloids • Methylene Disalicylic Acid • Paraformaldehyde
Parahydroxybenzoates • Penicillin • Pentaerythritol • Propyl Gallate
Resorcinol • Salicylates • Salicylic Acid • Streptomycin

DO 5 JOBS ON THIS 1 MACHINE!

It's the "Dual Worm"
Compounder Extruder*



compounds... colors...
extrudes... pelletizes...
reclaims scrap...

HERE is an extruding machine to slash your production costs by doing the work of five separate kinds of equipment.

The patented interacting "Dual Worms" that operate in a "pressurized" cylinder provide the explanation. They generate so much power, work so fast and knead so thoroughly that they're able to perform functions beyond the capacity of most conventional extruders.

Operation of the machine is simple and almost entirely automatic except for feeding raw materials or scrap into the hopper.

The "Dual Worm" Compounder Extruder is available with 2" worms—output approximately 100 pounds per hour. Larger, higher capacity units are in prospect.

Write today for prices and free descriptive brochure.

SMART & BROWN (Machine Tools) LTD.

24, 25, Manchester Square, London W. 1, England

Telephone: Welbeck 7941

Cables: Smartool, Wesdo, London

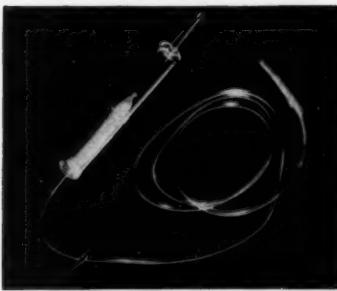
* By agreement with Messrs. WELDING ENGINEERS, Norristown, Pennsylvania, U.S.A., Smart & Brown (Machine Tools) Ltd. are the licensed manufacturers in England of 2" "Dual Worm" Compounder Extruders. They are also the sole distributors for all countries except North America. Local agents are being appointed.



KOPPERS POLYSTYRENE joins the Medical Corps!



Saftiset* and Saftifilter* are molded by Modern Plastics Co., Los Angeles, California, for Cutter Laboratories, Berkeley, California.



*Cutter Laboratories Trade Name

THE demand for certain types of medical equipment sent product engineers into their laboratories, and again they found another use for Koppers Polystyrene. They developed an all-plastic blood and plasma infusion set with a heart of Koppers Polystyrene. The filter housing for the woven nylon filter drip-meter is a rigid, transparent, completely sealed tube of polystyrene which has higher resistance to breakage than glass. Polystyrene needle adapters, at the ends of vinyl tubing, provide a tight, secure fit to the needle, and permit visual evidence of blood flow. The unit is sterilized before shipment and is discarded after use. These all-plastic, low-cost infusion sets are ideal for use in military field emergencies, receiving stations and base hospitals as well as in normal hospital applications.

Koppers Polystyrene 81 was used in these sets because its high heat resistance and easy moldability resulted in a faster molding cycle, and produced a light weight unit with a high resistance to breakage.

Technical data on the molding characteristics of Koppers Polystyrenes are available upon request. As always, we want to work with you to obtain the best results from your use of Polystyrene . . . to solve your particular molding problems . . . and to design new products to be made from Koppers Polystyrene.



Koppers Plastics make Many Products Better and Many Better Products Possible.

KOPPERS COMPANY, INC., Chemical Division, PITTSBURGH 19, PA.

SALES OFFICES: NEW YORK • BOSTON • PHILADELPHIA • CHICAGO • DETROIT • LOS ANGELES

May • 1952

It took the ingenuity and skill
of 360 men and women to solve

THE



CASE OF THE Smothered Pilot

a true story by "Ellery Queen"

TWO miles up, alone in the cloudless sky, the pilot was fighting for his life.

"He gasped and choked, as he struggled for air. His lungs were bursting, his ears rang, sky and earth and blazing sun whirled dizzily before his eyes. Blackness closed in . . ."

The big man, across the table from us, paused thoughtfully. The story he was telling had an important bearing on why he, as a representative for a major aircraft manufacturer, was visiting Pyro.

"Maybe", he continued, "you think I'm hinting at sabotage. Actually, the trouble involved a faulty cockpit ventilating system in our planes. The air duct had developed too many 'bugs' for comfort.

"Original design and specifications had called for the use of aluminum. But once aluminum became a critical material, we were forced to fall back on makeshifts to meet production schedules.

"This resulted in poor cockpit ventilation. That's why the pilot I just mentioned passed out. Luckily, he recovered in time to bring his plane in safely.

"But that's only half of the story. The other half is our problem of finding the right material, the right design for the ventilator and the most efficient way to produce it.

"Our feeling is that plastics may very well supply the satisfactory answer. We leave it to Pyro's engineering know-how and ingenuity to make recommendations. Remember, time is a vital factor, speed is all-important."

So Pyro went to work . . . engineers, technicians, designers . . . digging, probing, experimenting, discarding, calculating, burning midnight oil to arrive at the final workable solution.

The results were highly satisfactory. Pyro delivered the end-product on time, once again contributing a valuable service to the Armed Forces, effecting a saving in time, in money, in lives. Thus, Pyro successfully closed the "Case of the Smothered Pilot".

** ** **

Pyro, as one of the nation's leading custom injection molders, stands ready to serve all industry, with complete facilities under one roof for research and development, for designing and processing of *quality* plastic parts and products, always delivered *on time, at competitive prices*. Estimates submitted promptly upon receipt of your specifications.

STARTING POINT FOR A BETTER PRODUCT
Pyro PLASTICS CORPORATION
PYRO PARK, UNION, NEW JERSEY

illustrated by RICO TOMASO



FROM BRITAIN

ERINOID Polystyrene is now being produced by Styrene Products Ltd. in their new super-modern plant at Manchester, England.

Styrene Products Ltd. is a joint company of Petrochemicals Ltd. and Erinoid Ltd. The plant has a capacity of 5-6,000 tons per annum.

Absolute purity of product is ensured by sealing all buildings and by air-conditioning throughout. Operation is fully automatic at every stage.

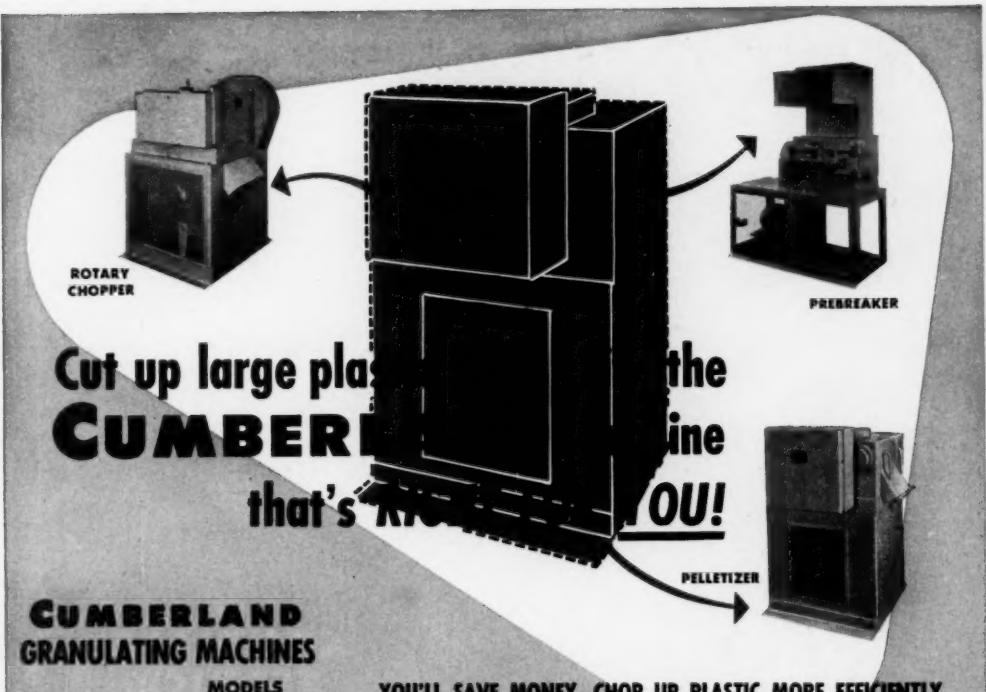
The plant was designed, engineered and constructed by Petrocarbon Ltd. whose comprehensive research facilities, together with those of Erinoid Ltd., will keep the project at the forefront of technical achievement. Consumers will benefit by the considerable operating and marketing experience of the whole set-up.

STYRENE PRODUCTS LTD

96 PICCADILLY · LONDON · W1 · ENGLAND

Marketing Agents:

ERINOID LTD · STROUD · GLOUCESTERSHIRE · ENGLAND



CUMBERLAND GRANULATING MACHINES

MODELS

0, $\frac{1}{2}$, $1\frac{1}{2}$

Small and medium capacity. Direct coupled for central grinding. V-belt driven for use beside each injection molding machine. Request Bulletin 250.



MODEL 10

Large $6'' \times 10''$ throat opening. For use beside each injection molding machine. Rugged, efficient, and easy to clean. Write for details.



MODEL 18

Large capacity. Double hung construction. Easy to inspect, dismantle, and adjust. Further details are in Bulletin 250.



YOU'LL SAVE MONEY, CHOP UP PLASTIC MORE EFFICIENTLY WITH A CUMBERLAND MACHINE THAT'S BUILT-FOR-THE-JOB

Your plastic reducing problems can only be solved by a machine designed to meet your needs.

Because Cumberland engineers realize this fact, they have designed and manufactured a complete line of plastic reducing machines — each built to perform better under specific operating conditions.

Let us know your requirements. We'll be glad to analyze your needs and recommend the Cumberland machine that's exactly right for you!

QUICK FACTS ABOUT CUMBERLAND MACHINES

NEW PREBREAKER: Cuts up television cabinets and other large parts. Available with $10'' \times 24''$ or $20'' \times 32''$ throat opening.

ROTARY CHOPPER: Versatile, heavy duty machine. Cuts thick vinylite slabs. For other applications, request Bulletin 400.

PELLETIZER: Pellets plastic material from continuous extruders.

Write now for complete details!

CUMBERLAND Engineering Company, Inc.
BUILDERS OF BETTER MACHINES FOR THE PLASTIC INDUSTRY
DEPT. 1 - BOX 216 - PROVIDENCE - RHODE ISLAND

California Representative:
WEST COAST PLASTICS DISTRIBUTORS, INC.
2325 Jesse Street, Los Angeles 23, Cal.



WE MANUFACTURE

Virgin Thermoplastic injection and extrusion molding compounds, standard and special formulations . . . Polystyrene, Polyethylene, Acetate, Acrylics, Ethyl Cellulose, Vinyls.

WE BUY

THERMOPLASTIC SCRAP — all types and forms: Polystyrene, Vinyls, Nylon, Ethyl Cellulose, Polyethylene, Acetate, Butyrate, Acrylics.

WE CUSTOM COMPOUND

your materials, and offer these special services: Sorting, De-contaminating, Color-Matching, Pelletizing.

WE EXTRUDE

any flexible or rigid formulation which you plan, for any special-shaped Belting, Binding, Edging, Rods, Tubes, Film, Strips . . . in Polystyrene, Cellulose Acetate, Polyethylene, Vinyl, Butyrate, Ethyl Cellulose, Acrylics.

*30 Years' Expert Know-How
and Large Facilities Are Your
Guarantee of Complete Satisfaction*

DRYCOL

offered as Gering's perfected dry coloring medium for in-plant coloring of **ALL PLASTICS**. No special skill or equipment needed. Standard, Special and Metallic colors available or to order.

GERING

Products, Inc.

KENILWORTH, NEW JERSEY

CHROMALOX gives you
the **LOW COST** answer



CHROMALOX

all-metal
electric radiant heaters

Get all the advantages of infrared heat and more—at a fraction of former costs with the new and improved CHROMALOX heating principle. All-metal construction, high heat intensity, infrared radiation that's "color blind" and heat that's infinitely variable, have proved CHROMALOX Radiant Heaters superior for over 300 different uses in more than 1500 plants. If you use heat for baking, drying, preheating, curing, degreasing and similar applications, CHROMALOX Radiant Heaters can very likely give more satisfactory results. See for yourself how these infrared units up output, improve uniformity, reduce costs.

CHROMALOX

Electric Heat for Modern Industry

May • 1952

**Time, money and
material saving
applications**

**FOR MORE INFORMATION
CHECK, CLIP AND MAIL COUPON**

PLASTICS

- Drying powders
- Drying Cellulose
- Preheating strips
- Preheating cloth
- Curing vinyl
- Post-forming
- Curing tubing

FOOD

- Warming
- Drying baking pans
- Dehydrating crackers
- Baking biscuits
- Dehydrating coconuts

TEXTILES

- Dehydrating braided material
- Drying Nylon thread
- Dehydrating woolen cloth
- Setting Rock

RUBBER

- Curing
- Heating rubber glue
- Curing latex

PRINTING

- Drying bottles
- Heating safety glass
- Setting dye on glass cloth
- Preheating lenses
- Drying mirrors

CERAMICS

- Drying frit
- Drying glaze
- Drying pottery

MISCELLANEOUS

- Sealing storage batteries
- Setting adhesives and cements
- Curing tobacco
- Melting wax
- Drying photographic negatives and prints
- Dehydrating kraft paper

and many other Applications

EDWIN L. WIGAND CO. Radiant Heater Division
7514 Thomas Boulevard, Pittsburgh 8, Pa.

I am interested in Infrared heat for _____

- Send me application file on uses I have listed.
- Ask factory representative to contact me.
- Send Chromalox Catalog on Industrial Heaters.

Name _____

Company _____

Address _____

City _____

Zone _____

State _____

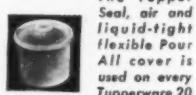
I.C.-61



Tupper Seal, air and liquid-tight flexible covers fit, and are included in the sets of all Tupperware Canisters.



The Tupperware 50 oz. Canister is "standard equipped" with the Tupper Seal, air and liquid-tight flexible Pour All cover.



The Tupper Seal, air and liquid-tight flexible Pour All cover is used on every Tupperware 20 oz. Canister.



The Tupper Seal, air and liquid-tight, Pour All cover as a cover for 46 oz. cans; Tupperware Sauce Dishes and other containers of metal, glass or pottery. Foods easily dispensed without removing entire cover.



The Tupperware Wonder Bowls are usually fitted with Tupper Seal, air and liquid-tight covers.



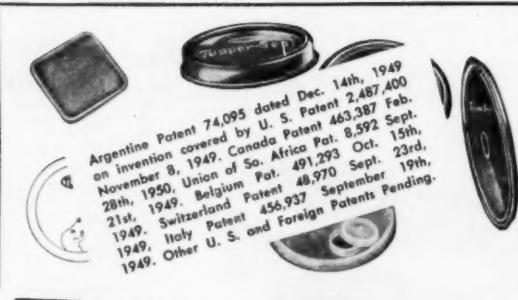
Manufacturers of — CONSUMER, INDUSTRIAL, PACKAGING AND SCIENTIFIC PRODUCTS

FACTORIES: Farnumsville, Mass., and Cuero, Texas

New York Show Rooms 225 Fifth Ave.

ADDRESS ALL COMMUNICATIONS TO: Department M-5

COPYRIGHT TUPPER CORPORATION 1949



TUPPER! Seals

air and liquid-tight, flexible covers for Tupperware Tumblers, Canisters, Wonder Bowls, Cereal Bowls and many another container of glass, metal and pottery, the contents of which it is desired to keep fresh and wholesome.



There's a Tupper Seal, air and liquid-tight flexible cover for Tupperware 2, 5, and 12 1/2 oz. Tumblers, too, and these Tupper Seal, covers fit many other containers of metal, glass and crockery.

The Tupper Seal, air and liquid-tight flexible Pour Top cover, specially designed as a dispensing cover for specified diameters of containers holding foods such as syrups, salad dressings, catsup, etc.



The cover of the Tupperware Bread Server which serves as a bread tray also is designed to give similar results as Tupper Seal, air and liquid-tight Flexible covers. Keeps contents fresh as no other such container.



When equipped with Tupper Seal, air and liquid-tight, flexible covers, Tupperware Cereal Bowls serve many another purpose.



The Tupper Seal, air and liquid-tight flexible cover made for Tupperware 8 oz. Tumblers also fits and is sold with all Tupperware Funnels as a base when funnels are used as storage containers.

TUPPER CORPORATION

TUPPER CORPORATION



Mildew destroyed this insulation

Milmer 1 controls mildew in vinyl products

Milmer 1 made this tubing mildew-resistant

Meet military specifications for vinyl film and vinyl-coated fabrics with the use of Monsanto Milmer 1 (Copper 8-quinolinolate). Dozens of military and government specifications for coated fabrics and vinyl film today require the incorporation of a fungistat. Milmer 1 meets the requirements of these specifications.

Sometimes effects of fungi are visible on products made from vinyls. At other times the fungi may not be visible but the plastic loses its flexibility and cracks. These ill effects are due to fungi eating away the plasticizer. Milmer 1 effectively controls fungi that cause deterioration of vinyls and vinyl coatings as illustrated in the pictures above.

Milmer 1 can be incorporated easily into the usual types of vinyl coating—calendered, plastisol, organisol and solvent. Properly applied, it will not cause crocking, bleeding or blooming, or cause production troubles on calender rolls. It is non-toxic and permanent.

If you would like information on military specifications on vinyls and vinyl-coated fabrics in which Milmer 1 can be used, or if you would like to know more about Milmer 1 in vinyls, contact or write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Mo.

Milmer: Reg. U. S. Pat. Off.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto Canada Limited, Montreal.

MILMER 1



SERVING INDUSTRY . . . WHICH SERVES MANKIND

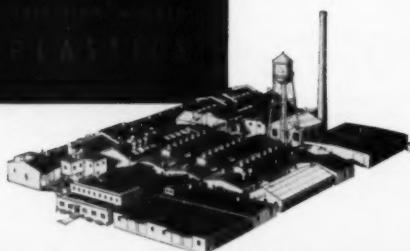
watch
your
balance

When you're walking the tightrope between shortages and high costs of materials, Aico molded plastics will keep your production on an even keel. Plastic materials with the strength of steel, the clarity of glass; materials impregnated with the beauty of a rainbow are at your disposal. Aico's booklet "Plastics from Your Point of View" shows how easy it is to revitalize your production with plastics. Send for free copy today.



American Insulator Corporation
NEW FREEDOM, PENNSYLVANIA

Aico's complete plastic molding service includes: Engineering Counsel; Mold Building; Injection, Compression and Cold Molding plus the molding of reinforced plastics.



A SPECIAL SERVICE TO MODERN PLASTICS READERS, REPORTING AND INTERPRETING THE LATEST NEWS AND DEVELOPMENTS FROM WASHINGTON AND ELSEWHERE AS THEY AFFECT THE PLASTICS INDUSTRY AND THE MOBILIZATION PROGRAM

Modern Plastics BULLETIN

April 18, 1952

Today's Market for Plastics

Economists, analysts, statisticians, and sales managers have so many varieties of opinions about how to read today's over-all business speedometer that a summary of their ideas would be so cluttered with contradictions that not even an electric robot brain could assemble them in orderly fashion. Last fall's optimists have red faces, but still insist that things might be worse and that everything will be lovely soon. Last fall's gloom peddlers would like to say: "I told you so!" but are scared to come right out and say it because there are still too many good omens lurking around the corner.

The average consumer seems to have as much money as ever, if not more, but it's going into savings accounts; unemployment lists are at a low level despite $\frac{1}{2}$ million more being unemployed in March 1952 as compared with March 1951; Government spending for defense has come up to almost $3\frac{1}{2}$ billion dollars a month from $1\frac{1}{2}$ billion a few months ago, but the "stretch-out" or some other intangible factor makes its impact seem minor; retail inventories are beginning to show signs of liquidation but retail sales are extremely spotty.

The most prevalent opinion, though not 100% unanimous, is that business in general won't decline from its present level and will probably get better due to various factors which have been discussed here before.

Plastics Maintains Level Operating Rate

The situation in plastics specifically has not changed radically since last December, which seems to have become the measuring month. At least December 1951 was thought to be the lowest over-all volume month for plastics since 1949 and there has been a slight upward climb since then. There is now some indication that no great upsurge will take place until September although moderate increases are expected month by month at least until July. A steel strike would probably affect the plastics industry's

customers more than it would affect the industry's supply line. Raw materials inventories would keep the industry going for a reasonable time, but their customers would feel the pinch sooner if they were not able to obtain steel for such things as refrigerators and other products that require plastics parts.

Polystyrene is a fair example of what's going on in plastics, except for some of the specialty, lower-volume materials like silicones, fluorocarbons, and polyethylene where demand is often still higher than supply. January sales of polystyrene at 15.1 million lb. were a bit over December, but it is doubtful that February or March will show a substantial increase. Our reports for April expressed general uncertainty early in the month. Many molders have expressed a desire to increase their orders for next month, but refused immediate delivery. Presumably there is a lot of cash tied up in accounts receivable. There also seems to be a greater than usual amount of low-cost, second grade crystal and colored molding material on the market which will be reported as part of the regular Government sales figures for polystyrene, in contrast to "scrap" which is not reported. Early estimates of a possible 400 million lb. of polystyrene to be molded in 1952 were revised downward to 320 million lb. a short time ago and could go even lower; first quarter sales may not reach 60 million lb. and the second quarter volume is, of course, still a matter of speculation.

Salesmen Dig for Orders

As long as phenolic molding powder volume remains around 14 million lb. as it was in January, the last month of record, there won't be too much complaint. It's never been much over 20 million lb. and it's only when the figure gets under 12 million that the molders begin to squirm. A 14 or 15 million lb. business is at least fair. It still leaves plenty of idle time for equipment and means that salesmen really have to dig for business, but compression molders aren't likely to go broke as long as that much business is around.

May • 1952

Appliance Industry Production

Once more, a few highlight figures from other industries that use plastics parts help to show what's happening. Vacuum cleaner factory sales were 235,936 in February 1952, compared to 230,226 in January and 261,572 in February 1951. Washer sales were 255,864 in February 1952 compared to 213,998 in January; February 1951 sales were 341,328 units. Refrigerator sales in February and January 1951 totaled 912,027 in contrast to 553,283 in the same period of 1952. Television makers insist that their stocks have been reduced to a two-weeks' production, as compared with a supply of several months that prevailed a year ago. There will be enough material for 1,150,000 autos in the July-September quarter, which compares with 1,600,000 in the quarter preceding Korea and with permitted production of 950,000 cars in the current quarter.

Urea and Melamine

Melamine material sales declined in December but not as much as most other plastics. The molded dishware business has held up and keeps moving ahead. Some 20 molders are now engaged in the dishware enterprise with one-third of that number accounting for a major part of the business.

Only a few major dishware molders are engaged in molding the Government specified rag-filled material into dishes although several million pounds are involved in this project. Molders claim that rag-filled melamine is more difficult to handle; since there is a good demand for civilian dishware, the molders are inclined to pass up the Government bid. Government procurement officers are unhappy about this situation. They want dishes produced by top-flight molders who can meet the Government's tough requirements and they are a little miffed about the situation. They feel that Government sources were a spearhead in obtaining approval of this material and in defending its use against charges raised by the Chinaware group. Some of them report it as possible that Government orders may be forced back to chinaware in applications that might otherwise have gone to melamine.

Moldings for Electrical Users

Melamine moldings for electrical purposes are showing a month by month increase, although the increase is relatively small when compared with total poundage. Connectors, used largely in aircraft and mentioned later in this Bulletin, are a leading item in this category. Molded electrical switch gear also shows promise of moving in on part of the business formerly enjoyed more exclusively by melamine-glass laminates, but it is probable that the base will be broadened rather than that either material will supplant the other.

Melamine decorative laminates have shown a slight increase since December. They were held back in the last half of 1951 because of the shortage in chrome trim for dinette sets and the severe slump in furniture sales which so far has shown only slight signs of revival. Analysts feel that a drive needs to be made to extend use of these laminates to other types of furniture and perhaps wall covering, base boards, and the like.

Melamine low pressure resins are reported to be still in the experimental stage.

Producers of urea molding materials are optimistic—not particularly about today's market but about the near future. Inquiries of a most promising nature foretell good business for some months in the future. Producers say that the increase in inquiries for future orders is due to quality appeal—that such things as urea radio cabinets and housings are going to get a larger portion of the market than heretofore because of good appearance and non-static properties. The producers' reasoning is based on talks with manufacturers who state that when competition is as tough as it is today, the maker of radio cabinets and housings for other equipment must build extra quality into his product and absorb the slightly higher cost of the resin in order to have superior sales appeal.

Molded urea closures, containers, and wiring accessories haven't set any volume records of late and won't until inventories are still further reduced. Buttons have been down for months because of the textile trade depression but that situation is beginning to look better.

There has been considerable interest expressed in the low cost brown and black urea resins which sell under 20¢ a pound. One producer has been gingerly offering these resins to the trade for some time. A second producer is now in the market with a similar material. It has taken some time for this development to "catch on" in the industry but it now looks as if a march up the ladder has begun.

Polyethylene

A substantial amount of new polyethylene came into production in April, and the effect was noted in a substantially increased percentage of polyethylene which was turned back to the producers for distribution as they saw fit. This is the so-called "free" category. Capacity now is estimated to be somewhere near 150% of what it was in June 1951.

All polyethylene available in April was divided as follows: 28% essential civilian; 32% military; 40% "free." It is probable that the essential civilian quantity dropped from 35% in March because a few items in this category had reached their limit of demand. The military allocation, which is 4% less on a percentage basis than it was in March, was greater on a volume basis since more polyethylene

was available. The 40% allowed for "free" allocation still won't meet demand. Some people claim that civilian demand is still double the amount that is being allocated. Those who have a purchasing history are now receiving considerably more polyethylene than they were a few months ago, but new customers and those who want to use it for new applications are still not able to acquire the desired amount.

Civilian Uses Continue to Gain

It is predicted that allocations all through the second quarter will go about 30 to 35% for military; 30 to 35% essential civilian; and 30 to 40% "free."

The demand for civilian polyethylene wire coating is still growing. The military wire coating program has tapered off somewhat but procurement for the Spiral 4 wire program has not yet reached the large scale expected. It is believed that polyethylene allocated for dried milk containers has reached its peak. The mine pipe program also has tapered off to some extent, but a new demand has come in for polyethylene pipe to be used for drinking water on farms and in some communities.

Watch Building Codes for Pipe Installations

Industry representatives advise caution in piping programs in order to keep from conflicting with city ordinances, most of which make no provision for plastic pipe. In some cases polyethylene pipe has been used in buildings on an experimental basis to replace copper. It is suggested that, whenever polyethylene pipe is used for any of these purposes, proper authorities be advised in order to avoid protest and criticism later on.

Chances that polyethylene will be removed from allocation within the next few months are not very bright. Despite increased production, military and civilian demands continue to grow. Good authorities on the subject tell us that it is very unlikely that polyethylene will be removed from allocation before the last quarter of this year, if then.

Connectors are Important

Among the hidden, or at least less publicized, plastics parts going into the Defense Program are thousands of small items used for electrical apparatus. Among these are connector plugs, used primarily in aircraft but with growing applications for tanks and Signal Corps equipment. These plugs have aroused recent attention because experimental work is now being done that is expected to result in redrafting of Specification MIL-C-5015 A for connectors; electrical; general purpose.

Several hundred thousand pounds of plastics are now being used each month for this item. Melamine, alkyds, diallyl phthalate, and mica-filled phenolics are the plastics; Neoprene and porcelain are also involved.

There are hundreds of these connectors on every airplane. The plastic parts vary in size from $\frac{1}{4}$ lb. to those so small that 40 or 50 can be made from a pound of material. The connectors are used to complete multiple wire connections through partitions and elsewhere. The plastic part is generally a disk in which the terminal parts are embedded and sealed against moisture to guard against failure caused by atmospheric changes.

Considerable difficulty has been reported lately because the terminals have been working loose, thus creating electrical troubles.

Filled melamine materials have had the bulk of this business for a long time. Phenolic was used originally but its arc resistance was too low. The problem today is to find a material that won't shrink over a long period. Diallyl phthalate is being tried and looks promising because, although it shrinks immediately after application, there is no further shrinkage after that initial flow. But even though the complete production of DAP is now being used for the purpose, the supply is limited. Whatever material is used must have arc and heat resistance; dielectric strength; and dimensional stability. Melamine producers are confident that they will continue to hold the bulk of this business because of melamine's general all-around properties and development of formulations that will meet any complaints which may arise.

Marine Corps Body Armor

The redesigned and restyled Doron body armor tested late in World War II has apparently won approval and respect from the Leathernecks who have been using it in Korea. At least, approval by the hard-bitten Marines would seem obvious from an announcement by the Commanding General, Marine Corps Depot of Supplies, Philadelphia, Pa., stating that he would be interested in hearing from manufacturers with a view toward expanding the supply of:

- 1) Cloth, ballistic, nylon—12.5 oz. basket weave (2x2) nylon cloth.
- 2) Plastic laminated fibrous glass plates (Doron).

Up until now the Marine Corps body armor has been made at Philadelphia by the Depot of Supplies (USMC) and L. W. Foster Sportswear Co. from ballistic nylon cloth used in multiple layers like that used by the Navy flyers in World War II and from glass laminate plates made by Continental-Diamond Fibre Corp.

The contracts will call for $5\frac{1}{4}$ by $5\frac{1}{4}$ in. multiple laminated plates with sealed edges produced from glass fiber and a "suitable" resin. The plates differ from the original Doron design in that they are molded with a concave surface to fit the contour of the body; the plates used in the 20,000 suits sent to Okinawa in World War II were flat. Years of developmental work have gone into this application and

know-how—in laying the fibers, and in applying resin, heat, and high pressure to acquire proper ballistic properties and a smooth concave surface—are such that only a few top notch laminators are expected to be competent or willing to touch the job.

The number to be ordered is restricted but will be sizeable. Eighteen lives have already been saved by the armored vest. One of the vests that saved a life contained 41 fragments but none of them penetrated to the body. Another Marine tells how he was hit in the stomach by a 4-in. square fragment from a mortar shell and suffered no harm. The vest won't stop a rifle bullet but it will stop .45 caliber or Tommy gun slugs as well as most shell fragments. Experiments will be watched closely in summer time to see if men throw away the vest in hot weather. It is comfortable and light (weighs $7\frac{3}{4}$ lb.) in comparison to the old style vest, and since 70% of all wounds occur in the torso where the vest serves as a protection, there may not be too much trouble in convincing men that it is a life saver when used in the combat zone.

The laminated glass plates are made to fit into small pockets of a nylon jacket. Their concave shape enables them to hug the body and overlap somewhat in the manner of fish scales so that complete flexibility of movement is maintained. The upper part of the vest to fit over the shoulders is fashioned from fragment-resistant multiple layered nylon just like any ordinary coat or jacket. One has to actually wear this garment before an understanding of its comfort and lack of bulkiness can be realized.

Phenolic for Plywood in 1952

The amount of phenol-formaldehyde resin that will be used for adhesives in plywood and kindred uses in 1952 is estimated by Government officials at over 50 million lb., in comparison to about 43 million lb. in 1951. This does not include resin used as a binder for waste wood.

From 1946 through 1951 phenolic adhesive resins enjoyed the greatest percentage of growth of any phenolic group; namely, 150 percent. The plywood industry has had serious ups and downs ever since Korea, largely due to price fluctuations and internal problems, but is now again on a rampage. In a recent week, production of softwood plywood was estimated to have been around 63 million sq. ft., or a rate of almost 3.3 billion sq. ft. a year, which would be about 300 million more than produced in the record year 1951. Production of exterior type plywood for the last week in March was 26.6% of total softwood plywood produced. It is expected to go to 30% before the end of the year.

In attempting to estimate the amount of solid resin used in plywood adhesives, it should be pointed out that there are a large number of variations in formula and classification of resin components. It has been impossible to find unanimity of opinion in the amount of resin used in these various formulations.

With that warning in mind, here is one rough estimate offered after consultation with various sources, including Government officials. There were 830 million sq. ft. of exterior grade plywood produced in 1951. That would have used up about 31 million lb. of solid resin, according to the formula which requires 37 lb. of solid resin per 1000 sq. ft. of $\frac{3}{8}$ -in. plywood. Each 37 lb. of resin would require roughly 12 lb. of phenol and 25 lb. of formalin (37% formaldehyde).

The estimate for exterior grade plywood most commonly used in Government circles for 1952 production is 1 billion square feet. That amount would reportedly require 37 million lb. of phenolic resin. Other amounts of phenolic resin for adhesives required in 1952 would be on the following order, according to a rough estimate:

For overlay and resin sealers on plywood	3,000,000 lb.
Hardwood segments for laminated wood—may be delayed in volume use but truck bodies for military use are a possibility	2,000,000 lb.
Canadian export	1,800,000 lb.
For extending blood glue used with interior plywood	4,000,000 lb.
For hardwood plywood	2,500,000 lb.
Add the 37 million lb. mentioned above	37,000,000 lb.
	50,300,000 lb.

Another rough estimate from Government sources divides the phenolic resin to be used for exterior grade plywood among the following applications for 1952:

Military, direct and indirect	15,000,000 lb.
Construction	7,000,000 lb.
Industrial and maintenance	7,000,000 lb.
Transportation	4,000,000 lb.
Miscellaneous	4,000,000 lb.
	37,000,000 lb.

It is not believed that softwood plywood usage will continue to grow at the same pace it has maintained since 1946. Military usage is partly responsible for the rapid upsurge since 1950. When more normal times return, civilian growth is expected to increase, but not enough to immediately take up the quantities now used by the Armed Forces.

Nevertheless, this does not mean that exterior plywood production will suffer a serious decline. Instead of its present one quarter of all plywood production for civilian purposes, it should soon take over at least one-third and perhaps more. Expanding use in freight cars and trucks or trailers seems a logical conclusion. Phenolic treated paper surfacing and alkyd resin coatings will make it more useful for panels and sheathing on houses. Phenolic glued redwood plywood may become a widely used construction material for homes in tropical lands. The future looks bright but a cautious soul should not overlook the limiting factor of logs and the necessity for developing a better surfacing material so that exterior plywood would be even more acceptable as an outside sheathing for homes.

STOKES

plastics review

VOL. 1
NO. 3
1952

PUBLISHED BY F. J. STOKES MACHINE COMPANY, PHILADELPHIA 20, PA.

New Versatile Twin-Screw Extruder for Precision Extrusion and Blown Film

The new Stokes-Windsor RC-65 was first shown making rigid PVC pipe from pre-blended powder at the Stokes Laboratory in Philadelphia during the recent Plastics Show.

The RC-65, smallest of three Stokes-Windsor extruders, excels in the production of shapes of small cross-section, and in making blown film of polyethylene or polyvinyl chloride. In addition, many companies find the RC-65 ideal for development work. Tubes, tapes, sheets, belting, channels, molding and pipe in continuous length are typical products. The RC-65 can be used for large sections—12-inch pipe or larger—though volume requirements for such work commonly dictate the choice of a larger unit. Two or more RC-65 units can be coupled to a common cross-head to produce multicolor extrusions.

The new unit is equipped to handle all kinds of thermoplastic materials and operates with



unvarying extrusion pressure, assuring complete absence of pulsation. Output is constant and operating cost is low. Production is nominally 65 pounds per hour.

Mechanical Products, Inc., Saves 80% with Fully Automatic Molding

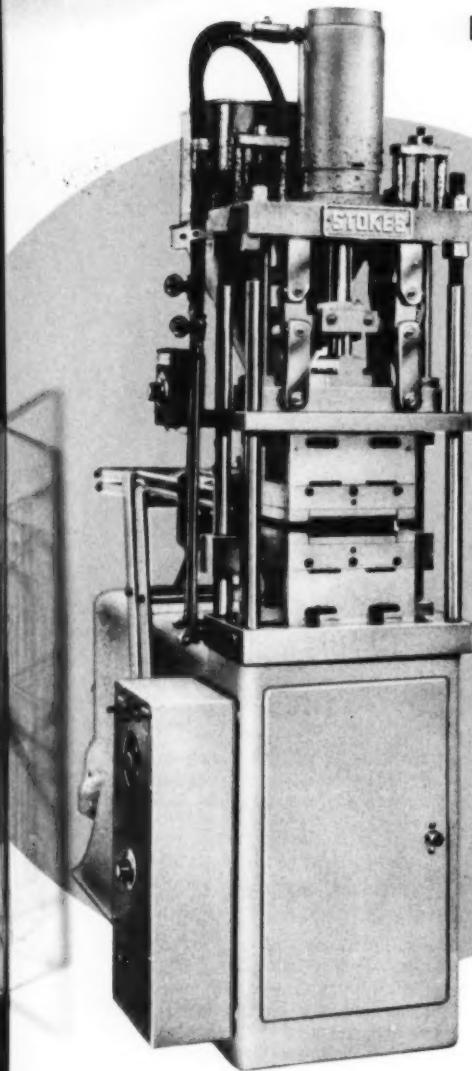
Mechanical Products, Inc., is using a battery of Stokes automatic plastics molding presses in its plant at Jackson, Michigan, for mass production of circuit breakers. Automatic molding has saved the firm 80% of cost as compared with earlier methods of production. Quality of product is improved, rejects sharply reduced.

Mechanical Products, Inc., makes circuit breakers for both aircraft and general industrial use. They have found their Stokes fully automatic plastics molding presses, such as the Model 741 pictured at the left, to be flexible, high-speed, economical units. For insert jobs, not suited to fully automatic molding, Mechanical Products uses a battery of Stokes Model 258 transfer presses.

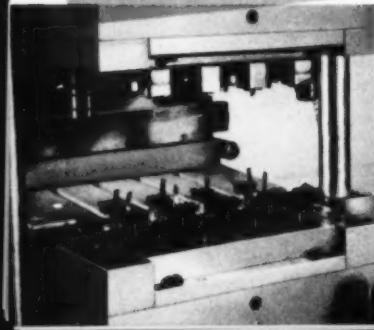


STOKES

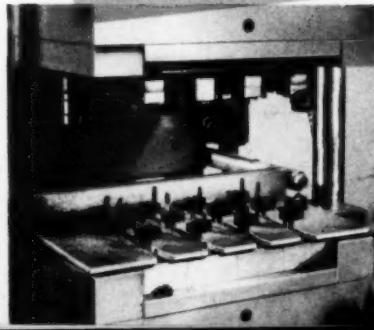
HERE IT IS! THE NEW STOKES MODEL 800!



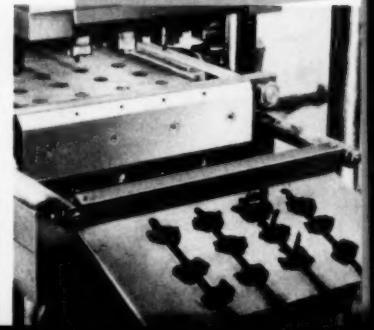
Press open . . . pieces raised
on knockout pins . . .



Comb in ejection position . . .
knockout pins ready to withdraw . . . ejection is mechanical and positive . . .



Comb discharges pieces . . .
shuttle feed approaching feeding position close above cavities . . .



You may have seen it in action at the Plastics Show in March . . . It's Stokes' latest contribution to the plastics molding industry . . . the new, fully automatic plastics molding press, Model 800 . . . designed to handle all thermosetting plastics, including alkyds without press modification.

The new Model 800 produces a wide variety of plastic items at unusually high speed . . . such items as appliance parts, tube sockets, switches, knobs and plugs . . . both simple and complex in design.

Cycle time of the new 15-ton press is only 5 seconds, exclusive of curing, and inclusive of feeding, closing, opening and ejection. Molding action is of the toggle type . . . fast in the clear and relatively slow in the mold to match the flow of material. One man can handle a battery of Model 800 presses, reducing labor cost to a minimum.





Sequence-operated, automatically, each step is dependent upon the successful completion of the preceding step. Main cylinder of the press is air-operated, its action applied and multiplied through a toggle.

Stokes Model 800 fully automatic plastics molding press is the fastest, most flexible and versatile press of its type now on the market. It accommodates any number or arrangement of cavities within the platen area, subject only to its 15-ton capacity. New type shuttle feed supplies multiple rows of cavities, from front to back . . . mold surface is clean . . . no material wasted. Ejection of molded pieces is mechanical, positive, and thoroughly dependable.

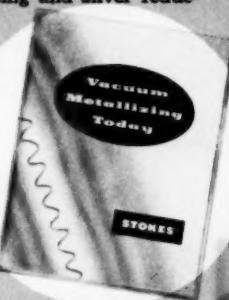
Molds made for earlier 15-ton automatic presses are adaptable to the new Model 800 press, and even easier to change on the new model.



How to Cut the Cost of Metal Coating on Plastics

A new 16-page brochure gives a comprehensive view of the fields—plastics and otherwise—in which vacuum metallizing has marked advantages over electroplating and silver reduction. For many plastics applications, of course, vacuum metallizing is practical when electroplating cannot be used at all.

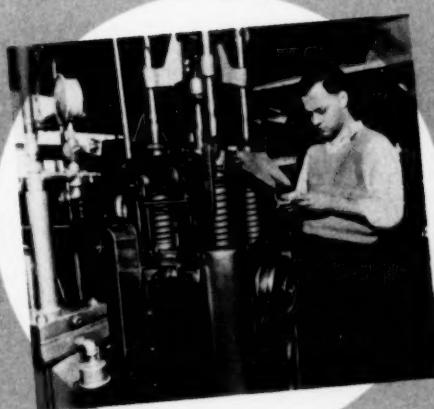
Principles of vacuum metallizing are described and schematically illustrated. Comparative costs are indicated. Practical uses are listed in surprising variety. One side, all-over, and second-surface coating are described.



Have you received your copy?

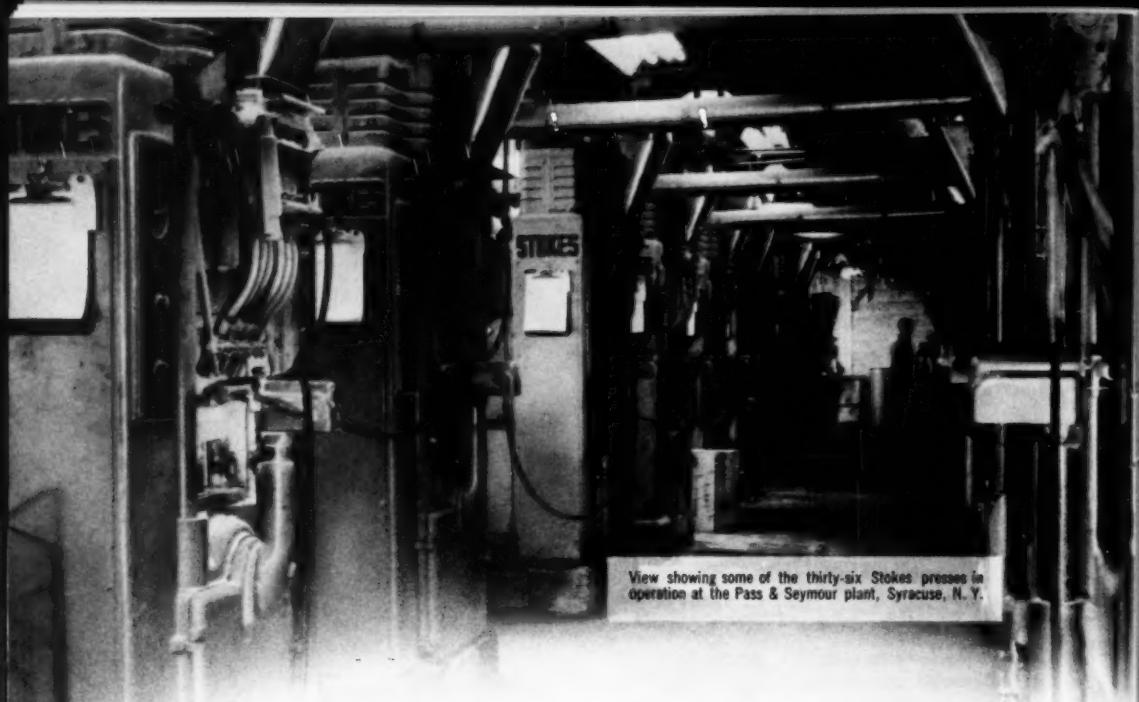
And of course, various Stokes models of Vacuum Metallizing units are pictured with specifications and mechanical descriptions. A copy of the new brochure—Catalog No. 725—is available on request.

Bakelite Using Stokes Preforming Press for Test Work



One of the most recent installations at the Bound Brook, N. J., plant of Bakelite Company, a Division of Union Carbide and Carbon Corporation, is a Stokes Model 294 plastics preforming press. The press is used for experimental and test work involving Bakelite phenolic and other molding compounds.

STOKES



View showing some of the thirty-six Stokes presses in operation at the Pass & Seymour plant, Syracuse, N. Y.

Thirty-six Stokes Automatics Now in Use at Pass & Seymour

Pass & Seymour, Inc., originators of the well-known P & S Despard Line of interchangeable wiring devices and Uniline plastic wall plates, are now using thirty-six Stokes presses to manufacture switches, plates, outlets and other electrical devices at their plant in Syracuse, N. Y.

Manufacturers of wiring devices for more than sixty years, Pass & Seymour recently developed a new Surfex Line of surface wiring devices which are molded on their Stokes presses. Originally, both bases and covers for the Surfex Line were made of porcelain. Changing from porcelain to Bakelite on the cover has reduced the shipping weight of the finished product considerably.

In many cases, the plastic electrical parts made by Pass & Seymour are designed expressly for molding on Stokes completely automatic presses, which has resulted in labor and material savings as well as providing finished parts which are identical and accurate in dimension.

Pass & Seymour are using Stokes Model 235-A, 50-ton completely automatic plastics molding presses, Stokes Model 200-D3, 15-ton fully automatic presses, and Model 741, 50-ton automatic presses.



Pass & Seymour foreman holds electrical parts made on a Model 235-A Stokes automatic press.

STOKES

STOKES MAKES Plastics Molding Presses / Industrial Tabletting and Powder Metal Presses / Pharmaceutical Equipment / Vacuum Equipment / High Vacuum Pumps and Cages / Special Machinery

F. J. STOKES MACHINE COMPANY
5534 TABOR ROAD, PHILADELPHIA 20, PA.

Printed in U.S.A.



Fabricated fittings for large size butyrate pipe are corrosion-proof, light in weight, and strong. Fittings for small diameter pipe are molded

*Progress
Report
on*



Courtesy Tennessee Eastman Co.

PLASTICS PIPES

Their light weight, ease of installation, and longer service life under

adverse conditions give them many economic advantages over metal

TWO years ago plastics pipes were in their infancy. But infants grow fast in the plastics industry, and a lot can happen in two years.

According to an article published in the March 1950 issue of *MODERN PLASTICS*,¹ this was the plastics pipes situation two years ago: saran pipe had "proved itself in many industrial applications"; polyethylene pipe was "in the final stages of development"; butyrate pipe, "experimental

in many applications," had "proved itself in one field"; reinforced polyester pipe was "ready for the commercial market"; all other types of plastics pipes were experimental.

Today, polyethylene pipe is being produced in quantity by a number of companies; pipe has become one of the largest applications of butyrate; reinforced polyester pipe is in production and is being tested by the Navy for shipboard use; pipe extruded of styrene copolymer materials is being widely used in cold

water applications similar to those for which butyrate pipe is used; rigid vinyl pipe has gone into production for use in chemical processing systems.

Advantages of Plastics

There are many reasons why plastics pipes are making such headway. Probably most important of all is their resistance to rust, corrosion, chemical attack, electrolytic action, and other factors which cause rapid deterioration of metal pipe. In many

¹ "Plastics Pipes Invade New Markets," *MODERN PLASTICS*, 27, March 1950, p. 69.

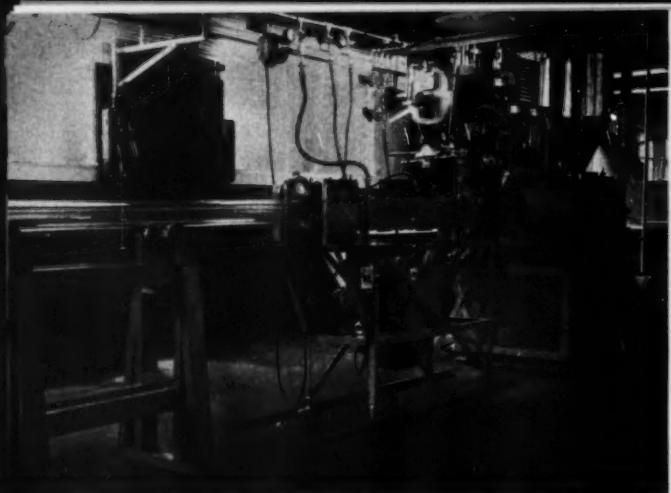
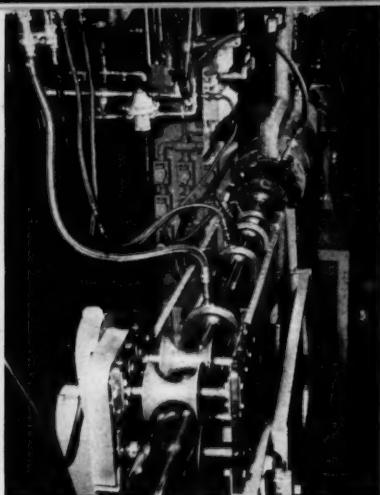


Photo courtesy Tennessee Eastman Co.

Transparent cellulose acetate butyrate pipe with 4½ in. o.d. and ½ in. wall is extruded at rate of 45 ft. per hour on 2½ in. machine. Pipe weighs about 1.8 lb. per foot



Pipe is cooled by air rings as it comes out of die; Driven pull-out rollers move pipe at constant rate

applications, where the effects of such factors on metal pipe necessitate frequent replacement of the pipe, the longer service life of plastics pipe gives them a tremendous economic advantage. In some cases, plastics pipe also has a lower initial cost. In other cases, higher initial costs of plastics pipe are cancelled out by the elimination of replacement costs.

An excellent example is the experience of a plant which was coat-

ing television tubes. The galvanized iron pipe originally used in this plant usually lasted about two months. A saran system which cost about three times as much as the iron piping was installed. After 18 months of continuous service, the saran piping showed no signs of corrosion.

Another important advantage of plastics pipe is ease of installation. It is so much lighter than metal pipe that it can be handled easily, often

with less labor. Most plastics pipes can be cut easily with a hacksaw or crosscut wood saw—some can even be cut with a pocket knife. Furthermore, the availability of some plastics pipe in long coiled lengths often eliminates the need for numerous fittings in certain installations. As a result of all these factors, the installed cost of plastics pipe is often less than the installed cost of metal pipe—even though the metal pipe may cost less per foot.

Another advantage of plastics pipe which should be mentioned is the fact that, because of smooth interior walls, it has less frictional resistance to the passage of liquids than does metal pipe. Thus a smaller plastic pipe can often transmit as much liquid as a larger metal pipe.

Saran

The applications of saran pipe were listed in these pages two years ago. They included the use of such pipe in electroplating plants, in rayon processing plants, in pharmaceutical plants, in chemistry laboratory waste systems, in paper plants, in food processing plants, and others. The use of saran pipe in such applications has increased many fold since 1950, according to the three leading producers of such pipe.

Saran pipe is also being used in some municipal sewage disposal systems. At present, this use is limited to small systems, because saran pipe

Polyethylene pipe has been used successfully in a number of radiant heat installations. Its light weight and flexibility make it much easier to install than copper tubing

Courtesy Carlon Products Corp.



BUTYRATE PIPE FOR GAS SERVICE LINES



Photos courtesy Golden Bear Mfg. Co.

Butyrate pipe is being used for both new and replacement gas service lines connecting mains and users' homes. Its main advantage is its resistance to rust, corrosion, and electrolytic action. Another advantage is ease of installation. Joints can easily be made in the field by applying butyl acetate cement (1) and slipping end of pipe into flared end of next section (2). The butyrate pipe also has greater carrying capacity. Thus, smaller diameter pipe can be used and can be installed by using the old steel line as a conduit through which pipe is fed from street end (3) to house (4).



Photos courtesy Tennessee Eastman Co.

is not available in sizes above 4 in.²

The principal producers of saran pipe are American Hard Rubber Co., New York, N.Y.; Elmer E. Mills Corp., Chicago, Ill.; and Yardley Plastics Co., Columbus, Ohio.

Polyethylene

Polyethylene pipe, which was in the late stages of development only two years ago has grown into an important part of the plastics pipe picture. Production problems have been solved and polyethylene pipe is being successfully produced by American Hard Rubber Co.; Anesite Co., Chicago, Ill.; Carlon Products Corp., Cleveland, Ohio; Crescent Plastics, Inc., Evansville, Ind.; Golden Bear Mfg. Co., Los Angeles, Calif.; Johnson Plastic Corp., Cha-

rin Falls, Ohio; Elmer E. Mills Corp.; and Yardley Plastics Co.

One of the main applications of polyethylene pipe is in cold water systems, particularly in adverse soil conditions. An excellent example is the municipal water system installed in Pax, W. Va. About 25,000 feet of Yardley polyethylene pipe went into the installation.

In this location, the terrain is irregular, strewn with heavy boulders, and bedrock can be struck almost anywhere at a depth of three feet. The flexible polyethylene pipe used could easily be zig-zagged to follow snake-like trenching patterns necessitated by ground conditions.

An additional advantage of polyethylene pipe in this installation is the fact that it will not be affected by the sulfur-bearing shale in the area which eats up iron pipe in three years or less.

² All pipe sizes mentioned in this article are standard nominal pipe sizes, except where other methods of measurement (such as o.d. or i.d.) are specifically mentioned.

Another important use for polyethylene pipe is in jet well installations. Here the main advantage is ease of installation, which results from the fact that the pipe is available in long coiled lengths.

Polyethylene pipe has also been found suitable for draining water (which often contains corrosive elements) from mines. Here again, one of its chief advantages in this application is flexibility.

And once laid, polyethylene mine pipe is so easy to move that it is simply dragged around to a new facing when one is abandoned. With metal pipe, the labor of disassembly and transportation was more than the cost of the pipe. As a result, metal pipe was often abandoned when the facing was abandoned.

Other applications in which polyethylene pipe is being used successfully include radiant heat installations, handling sewage, irrigation systems of various types, bottling plant piping systems, and chemicals handling.

Butyrate

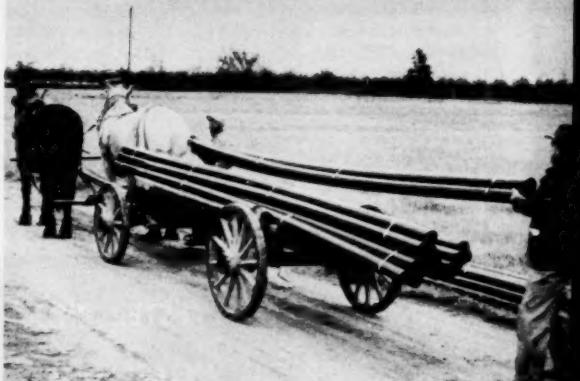
Most of the cellulose acetate butyrate pipe produced finds its way to the oil fields where it is used to carry salt water, crude oil, sour crude oil, and natural gas. Butyrate has been used successfully in contact with all these corrosive substances, and in locations where electrolytic action had been a major problem, without any apparent corrosive action.

In addition to ending the corrosion problem in such applications, butyrate pipe also solves another problem. In some locations, paraffin produced with the oil deposits itself on the inside of the pipe, clogs the pipe, and necessitates shutdowns to clean out the inside of the line. In the worst paraffin areas, such shutdowns (with consequent labor costs and loss of production time) are necessary every few days. Butyrate has been used successfully in such areas and remains clean after continued service.

Outside of the oil fields, the most important application of butyrate pipe is to carry gas from mains to consumers' homes. Butyrate pipe is also used in water distribution lines similar to those for which polyethylene pipe is sometimes used.

Transparent butyrate pipe with 4½ in. o.d. and ¼ in. wall section is

LAYING BUTYRATE PIPE IN AN OIL FIELD



Photos courtesy Tennessee Eastman Co.

Bundle of three 20-ft. lengths of 4-in. butyrate pipe weighs 60 lb., can easily be lifted by one man (1). Stock of pipe can be distributed on job by team of horses and two men (2). Pipe is joined in field with solvent cement (3) and slip-sleeve coupling (4) by crew of three men using no equipment (5). One man can lower joined pipe into ditch (6).

also being used in a number of in-plant test installations. It is carrying such liquids as brine solutions, water-cellulose acetate slurry stock, and acetic acid-water solutions with traces of sulfuric acid. After months of such service, the butyrate pipe shows no visible evidence of physical deterioration.

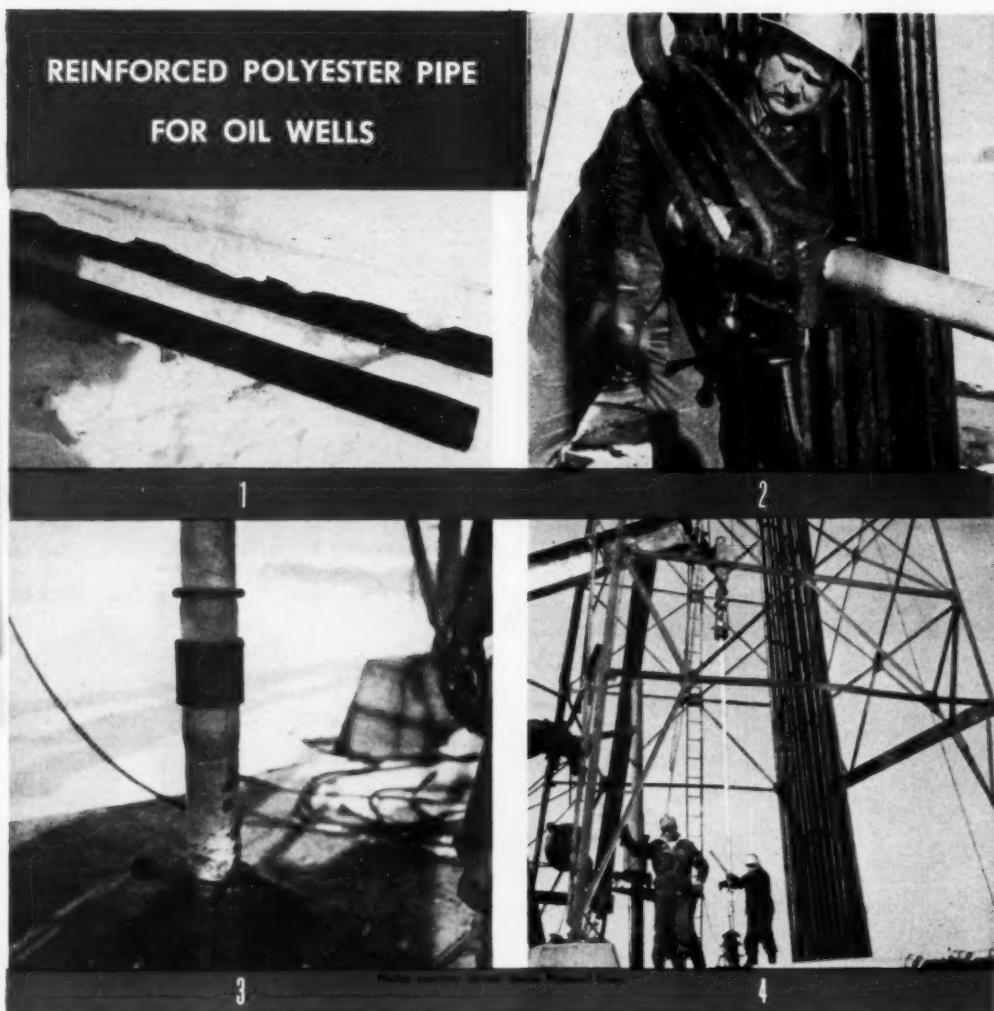
Butyrate pipe is now being produced by Anesite Co., Carlon Products Corp.; Crescent Plastics, Inc.;

Golden Bear Mfg. Co.; Elmer E. Mills Corp.; Nebraska Plastics, Inc.; Cozad, Neb.; Yardley Plastics Co.; and others. Most of the foregoing companies are extruding the pipe in sizes ranging from $\frac{1}{2}$ to 6 in.; the type of fittings used varies with the manufacturer and with the application of the pipe.

Some of the companies are offering regular threaded fittings which are injection molded or fabricated.

Others have extruded sleeve-type couplings which slip over the pipe ends and are held in place by solvent-cements. Another method of joining is to make a bell-like flare on the end of one pipe, fit it over the next section, and cement it in place.

Unlike saran and polyethylene pipes, which are usually extruded of black material, butyrate pipe is often produced in a transparent form. In some applications, particu-



Reinforced polyester pipe is now being tested in vertical installations in oil wells to replace metal pipe which is literally eaten away by effects of corrosion (1). Polyester pipe is lifted into position (2), joined to section below it with threaded coupling (3), and lowered into the well (4). The reinforced plastic pipe is much lighter than metal and thus can be handled more easily. It can be cut with a hacksaw and can be threaded with conventional equipment used on metal pipe. Because the resin is thermosetting, weight of pipe cannot cause cold flow in vertical installation.

larly in-plant systems, this is an additional advantage in that it permits visual inspection of flow.

Styrene Copolymer

Pipe extruded of styrene copolymer materials is a newcomer to the plastics pipes family. Its applications to date can best be summed up by saying that it is used for the same types of jobs as is butyrate pipe. It is used for cold water piping, for in-plant installations, and some formulations of the material are available to be used for applications in the oil fields.

Styrene copolymer pipe is now being produced by Anesite Co.; Carlon Products Corp.; Crescent Plastics, Inc.; Golden Bear Mfg. Co.; Elmer E. Mills Corp.; and Yardley Plastics Co.

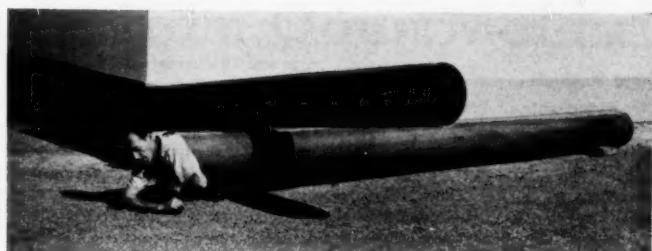
A large installation of styrene copolymer pipe was made recently in a sprinkler system for a pine tree nursery operated by the Florida Forest Service. Over \$20,000 worth of pipe was involved in this single installation.

Manufacturers of house trailers have shown great interest in styrene copolymer pipe for the plumbing systems in those trailers. Many such installations have been made, but most extruders of such pipe doubt the wisdom of this application. There is some question as to whether the pipe can stand up under the vibration it would encounter in house trailers. Furthermore, as one extruder points out, "Trailer manufacturers don't really buy pipe. They buy fittings and use a few short straight pieces to connect up the fittings."

Reinforced Polyester

Progress in reinforced polyester pipe has been slow in the last two years. United States Plywood Corp., which was the only company producing such pipe two years ago, is now producing pipe in sizes from $\frac{1}{2}$ to 6 inch. The method of production has already been described. Fibrous glass reinforced polyester pipe is also being produced by Carl DeGanahl Co., New Brunswick, N.J.; Perrault Bros., Inc., Tulsa, Okla.; and Reflin Co., Culver City, Calif.

DeGanahl is making 2, $3\frac{1}{2}$, and 4-in. i.d. polyester pipe which is reinforced with a combination of Fiberglas roving and spiral-wrapped Fiberglas tape formed on a vertical



Courtesy S.A.S. Lavorazione Materie Plastiche

In Italy, hard vinyl pipe is replacing sandstone piping in many applications. It is extruded in diameters up to 15 in. with wall thicknesses ranging up to almost $\frac{1}{2}$ inch

mandril. The wall thickness of the pipe is varied according to the particular application and the strength requirements involved.

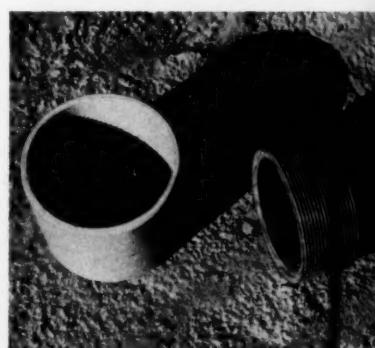
Perrault is currently producing $3\frac{1}{2}$ and $4\frac{1}{2}$ -in. pipe, each size in three wall thicknesses, and is planning to make $2\frac{1}{2}$ and $6\frac{1}{2}$ -in. pipe in the near future.

Perrault's pipe consists of 28% glass fibers and 72% polyester resin. The fibers are wrapped around a mandril in layers, each of which has the fibers oriented at a 90° angle to the fibers in the preceding layer. Thus, half the layers have the fibers oriented around the pipe, and half of them have the fibers oriented with the length of the pipe.

The wrapped mandril is loaded into a mold and the mandril is withdrawn. The mold is then spun so that the reinforcing layers are forced against the interior walls of the mold, and the resins are sprayed in while spinning continues. The pipe is cured at 200° F. and the finished pipe has an inside wall of pure resin to insure a smooth finish.

The Navy is seriously interested in the possibilities of reinforced polyester pipe for shipboard use. One test of its suitability was made by installing some pipe made by U.S. Plywood in representative places aboard a destroyer escort. After an 8-month sea test, the Navy states that "the commanding officer of the vessel expressed complete satisfaction with the performance of the pipe and forwarded enthusiastic recommendations to the Bureau of Ships."

The use of reinforced plastic pipe, according to the Navy, could effect substantial cost savings. The 2-in. plastic pipe with $\frac{1}{8}$ -in. wall will cost 70¢ a ft., as compared with



Courtesy Perrault Bros., Inc.

Reinforced polyester pipe consists of 28% glass fibers and 72% resin

\$1.55 for copper-nickel pipe and \$2.25 for stainless steel pipe. Black steel pipe, which costs 55¢ a ft., is not considered suitable for shipboard use because of the fact that it corrodes readily.

In addition, the tests indicate that the plastic pipe will outlast metal. Plastic pipe installed just aft of the forward guns, for example, "remained good as new while nearby steel pipes had to be removed because they were damaged by the combination of corrosion and shock." Similarly, the plastic pipe was not damaged during a severe storm which caused several metallic pipes to give way.

The plastic pipe sections used were not threaded. They were joined with sleeves which were 0.006 to 0.012 in. larger than the pipes; the clearance space was filled with resin. Although none of these joints developed leaks during the service tests, the Navy feels that some in-

stallation problems still remain that should be solved.

Other Materials

A recent entrant into the field of plastics pipes is hard vinyl pipe, which is now being produced by the Van Dorn Iron Works Co., Cleveland, Ohio; American Hard Rubber Co.; The Bolta Co., Lawrence, Mass., and Munray Products, Inc., Cleveland.

Heavy wall non-plasticized polyvinyl chloride pipe is capable of conducting acids, alkalies, salts, oxidizing agents, oils, greases, alcohols, carbon tetrachloride, and other liquids at temperatures below 170° F.

The hard vinyl pipe is said to have high impact strength, even at sub-zero temperatures. It can be welded, machined, threaded, and even formed by heating it above 250° F.

Hard vinyl pipe produced in Italy by S. A. S. Lavorazione Materie Plastiche, Turin, is said to be replacing sandstone piping because of its resistance to acids, salts, oils, fats, and other chemical agents. The hard vinyl pipe is being extruded in diameters up to 15 in. with wall thickness up to almost 1/2 inch.

The next entry in the plastics pipes field will probably be nylon. Suprinent Mfg. Co., Clinton, Mass., has been doing considerable develop-

ment work on the extrusion of nylon pipe. Although quantity production has not yet started, the company is ready to produce the pipe in various sizes and wall thicknesses.

And after nylon there will undoubtedly be other plastics materials which will be used to extrude pipes. After all, a pipe is just a tube—one of the simplest forms of extrusion—and any thermoplastic can be extruded. Thus it is inevitable that existing thermoplastics and those which will someday become available will be thought of for pipe. And many of those materials will find their share of the growing market for plastics pipes.

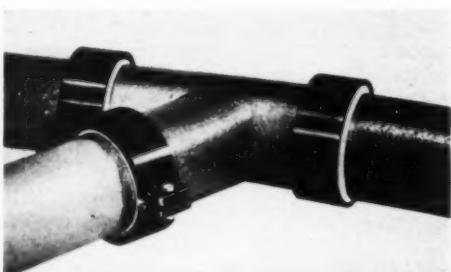
Plastics Joints for Clay Pipes



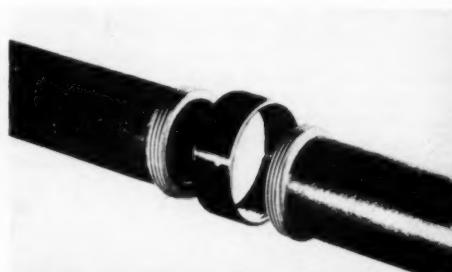
Clay pipe has absolutely leak-proof joints made up of vinyl plastisol male threads molded directly onto ends of pipe; fittings and female-threaded couplings are molded phenolic

A leak-proof, infiltration-proof joint for clay pipe has been developed by Robinson Clay Product Co., Akron, Ohio, one of the largest manufacturers of clay pipe. The joint, known as Screw-Seal, makes use of two plastics materials, vinyl and phenolic.

Male-threaded ends are molded directly onto the ends of the clay pipe with vinyl plastisol. Two such ends can then be joined together by threading them into a female-threaded coupling molded of phenolic. In hard-to-get-at places, a plastisol band is placed over the threads and a split phenolic coupling is bolted around the pipe ends.



For easy assembly of T and Y joints, split phenolic coupling is bolted around vinyl plastisol band over vinyl threads on pipe



Straight lengths of pipe are joined with vinyl male threads and molded phenolic sleeve. Resilience of vinyl insures tight seal

Foamed Vinyl from Open Molds

FOAMED vinyl plastisol at a cost comparable to that of foam rubber in fabricated form is now possible as the result of the development of an economical method of foaming in low-cost molds. The special compound used, based on Vinylite plastisol resins, was developed by Elastomer Chemical Co., Nutley, N.J.

The foamed material has better flame resistance and better chemical resistance than foam rubber and can be fabricated more easily. It also has the advantages of light weight, flexibility, and resistance to aging, moisture, abrasion, and tearing. It does not oxidize, dry out, or harden, and has high resilience and elasticity. It is practically odorless and can be made in any color.

Foaming Process

The foaming process consists of three simple stages and uses only low temperatures and pressures. The first stage is to expand the formulation with gas. The liquid formulation is poured into a pressure cylinder. Then a gas under about 400 lb. pressure is introduced to expand the liquid compound. The cylinder is sealed off and vigorously agitated until the gas is partially absorbed by the plastisol. The material then has the consistency and flow of thick whipped cream.

The second stage of the process is to charge the molds by allowing the gas pressure to force the material out of the pressure cylinder. The material settles evenly into the mold cavity and retains its expansion in open air for as long as 90 min. before curing. The molds are lightweight, open molds. Corrugated paper has even been used successfully as a mold.

The final stage of the process is to cure the material in an oven at temperatures between 225 and 275° F. A tough skin that resists tearing and abrasion forms on all outer surfaces of the molded object as it cures.

The foaming method is easy to control and is not critical at any point. The density of the foam can be varied from 12 to 18 lb./cu. ft., and the expansion from 400 to 800% by simply varying the formulation,

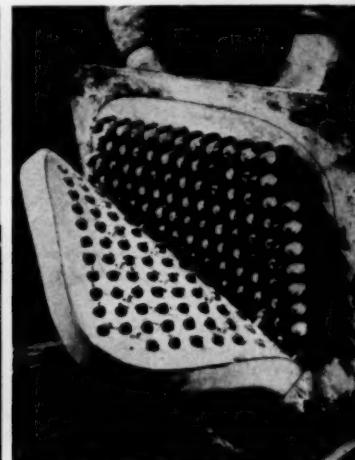
gas pressure, and cure temperature.

The vinyl foam can also be laminated to textiles or to plastic film or sheeting as a cushion backing for furniture applications. Foam of

more than an inch in thickness can be coated and cured in place on any width of fabric or film. Foam laminates on vinyl can also be heat-sealed or embossed electronically.



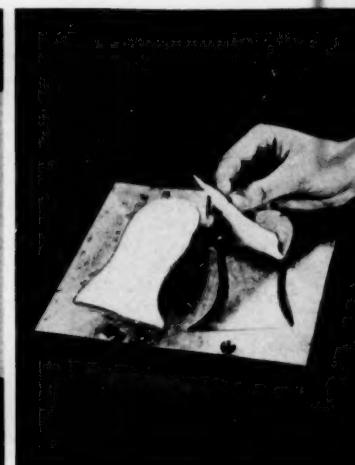
Foamed vinyl is charged directly from the pressure cylinder into a mold for a seat cushion



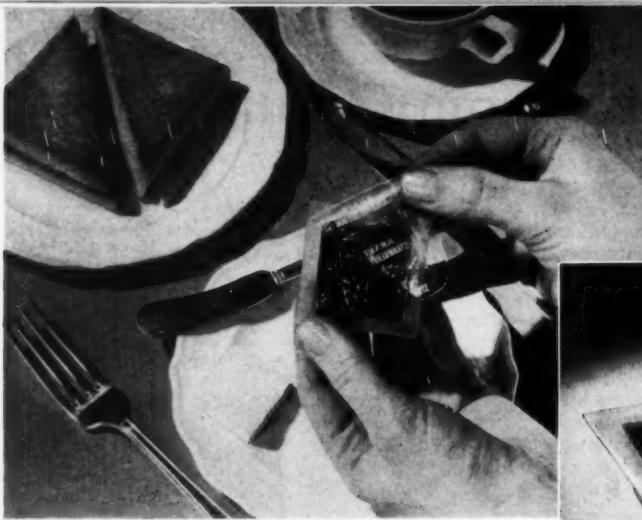
After curing, the complete seat cushion is easily stripped from the mold



Thin shoe pads of foamed vinyl are made in simple open molds, cured at low temperature

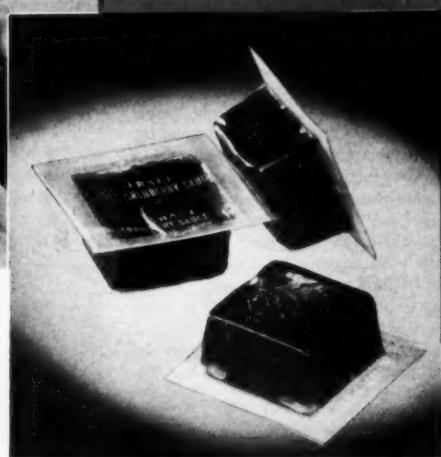


Shoe pads come from mold with a tough skin formed during the cure



Economy, convenience of use, and high sanitary standards are achieved with individual portion packages of jams, jellies, and cranberry sauce

Right: Individual portion packages are formed from vinyl sheet stock with top flange to which a sanitary protective covering is heat sealed



BLANKING, forming, filling, and sealing individual-portion food packages at a rate of approximately 300 per min. is one phase of a new development in institutional feeding recently announced by Kraft Foods Co., Chicago, Ill. Basic to the development is a thin, strong Vinylite sheeting, especially compounded to be compatible with food products. The vinyl material, entirely inert, is semi-opaque with a slight tinge of white which gives the package an attractive sanitary appearance.

The food container itself is square in shape and is formed with flanges at the top edges. The containers hold $\frac{3}{4}$ of an oz. of jam or jelly or 1 oz. of cranberry sauce. The container is sealed with a transparent plastic film closure, the exact nature of which is held secret by Kraft. It might be either vinyl nitrile or saran. The covering film is so placed on the container that it slightly overlaps the flanged top. Thus, it is easily peeled off, giving access to the contained product. The process of packaging is such that the food, from the instant of filling the container, is entirely sealed from human hands, dust, insects, and other sources of possible contamination. While the present

package is square, Kraft officials say that there is virtually no limitation on the sizes and shapes that can be produced in the completely automatic operation.

Portion Packaging

Objective of this new development in food service is to meet the needs of institutional feeding operators with low cost, labor saving, inventory control, quality, and sanitation, in individual food portion packaging. Kraft labels this development "Portion Control."

To date, Kraft is packaging only jellies, jams, and cranberry sauce in these individual plastic containers. However, officials of the company believe that the line may be extended in the near future to include a long list of individual servings of foods, from appetizer through dessert.

The plastic package and the method of sealing was originally developed by Foodies of Manhattan Ltd., from which organization Kraft has acquired the use, in the food field, of packaging facilities and methods.

Already the portion-control packages have been enthusiastically received by railroads, hotels, airlines,

etc. Present users have reported substantial savings through a reduction in kitchen labor costs, elimination of waste, and improved quality because of the sealed container. In addition, there has been a strong and favorable consumer reaction largely because of the obvious sanitary safeguard furnished by the closure. Also, because the container is sealed, it is possible in most cases to re-serve portions which have not been opened. Empty containers are discarded.

Material for the containers is furnished by Bakelite Co., and facilities for the production of the individual service package have been set up by Kraft in Chicago. Present prospects are that several other facilities in various parts of the country will go into operation in the near future.

Production Methods

Custom made machinery, said to have involved several years of research and development, is used to produce the filled containers from flat vinyl sheets. Simply stated, the flat sheet and the food in bulk are fed into the machine; filled and sealed containers come out the other end. The filling and sealing are done at a temperature of 200° F., which

PORTION AT A TIME

Individual servings of jellies and jams
are provided in an unusual vinyl package
with an easily removed heat-sealed cover



Four varieties of portion control items are presently being packaged. Automatic machinery forms, fills, and seals packages at 300 per min. rate

insures not only a perfect seal but also sterile packaging conditions.

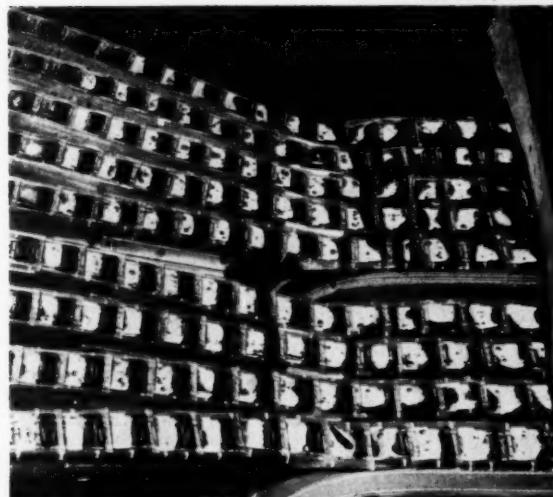
The actual sealing operation is so controllable that the closure may be lightly or tightly sealed, depending on the perishability of the packaged food. Since the closure film extends beyond the edge of the container, it

can be easily grasped and removed by the consumer.

After sealing, the containers travel through a cooling chamber. They are conveyed on a wide belt provided with grooved tracks, each of which carries a line of filled containers. The delivery end of the tracks feeds into

two flat tray-like containers which each hold twenty of the individual servings. Thus the track belt feeds two lines of master containers at a time, ten of which are packed directly into a shipping carton designed to hold 200 of the individual containers.

Photos courtesy Kraft Foods Co.



After the packages are formed from vinyl sheet and automatically filled and sealed at 200° F., they are carried by conveyor through cooling tunnel (right)



As individual portion packages come out of the cooling tunnel (top), they are placed in boxes of 20 portions each

Britain's Plastics Industry

by W. M. YORK*

GRWTH of the plastics industry in Britain can best be illustrated by comparing production figures. In 1938 the industry's capacity for the production of plastics materials was approximately 30,000 tons per annum; by 1951 the figure had risen to 100,000 tons; by 1953 the potential plant capacity will be 339,000 tons.

This expansion reflects not only the growing use of plastics in the home market but also the energetic export

* Chairman of Publicity Committee, British Plastics Federation.

business which has been built up. For example, the monthly exports of materials are now worth in excess of £1,000,000 (\$2,800,000); £500,000 (\$1,400,000) worth of United Kingdom plastic toys (other than dolls) go to the markets of the world each month.

Most firms operating in the industry are members of the British Plastics Federation, which speaks for the industry in official negotiations. It has sections representing the main divisions of raw materials, manufac-

tured materials, molding, fabricating, laminating, and engineering, and although these sections have autonomy within their own spheres, they come together under the Council of the Federation, and thus the forward planning of the industry, its problems and their solution, find common ground for discussion and progress.

Emphasis on Quality

The emphasis of much of the industry's work is on quality and aims at getting plastics materials and products accepted for their unique qualities rather than as substitutes for other materials which may be temporarily in short supply. The expanding business in the home market shows that the public, not quick to change its buying habits, recognizes the advantages of new materials and techniques.

To ensure quality, standards are required, and there is a close link between the plastics industry and the British Standards Institution. An interesting series of specifications has already been agreed and published. These range from materials to finished products, as in the case of plastic sheeting and the rainwear made from that material. Picnic-type tableware is among other products for which specifications have been prepared, and any product which complies can carry a certification mark.

Plastics in Industry

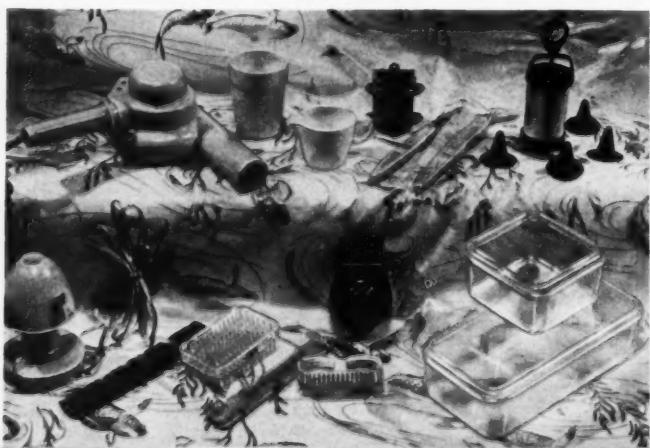
Industry, too, is finding numerous uses for plastics. Polythene, developed in Britain during World War II for radar work, has proved itself ideal for piping, and for cable covering. Other plastics are being used increasingly for gears, pulleys, winding bobbins, electrical parts, and in a host of other ways to enable industry to produce more efficiently; they all offer characteristics which earn them a permanent place in future designs.

In home and export business, in the defense program, and in every aspect of the British economy, plastics are becoming progressively more significant, and the latest developments will be shown at the British Industries Fair to be held in May of this year.



Plastic toys, like these one-piece molded sports cars, are an important product of Britain's growing plastics industry. About \$1.4 million worth of toys (excluding dolls) are exported monthly.

Molded plastic domestic ware has also been on the increase in Britain; the items illustrated here are some of the household applications of plastics to be shown at the British Industries Fair



At the

5th

N.P.E.

ALMOST 18,000 representatives of industry and government procurement agencies attended the 5th National Plastics Exposition held in Convention Hall, Philadelphia, March 11 through 14. There they viewed exhibits of the materials, products, and services of 137 companies, including materials manufacturers, molders, extruders, laminators, fabricators, machinery manufacturers, and other suppliers to the plastics industry.

The consensus of the members of the MODERN PLASTICS editorial team which covered the display and of the exhibitors interviewed was that the show was the most successful ever held by the industry. Exhibitors were almost unanimous in the opinion that the physical accommodations, the quantity and quality of attendance, and the interest shown in the exhibits by buyers were all eminently satisfactory.

As was the case at the 4th National Plastics Exhibition in Chicago in 1950, the editors of MODERN PLASTICS found that the major emphasis was on solid, proved applications and materials rather than upon the new and novel. There were, of course, many things which were new in the sense that they had not previously been announced or publicly shown. But none of the new things on exhibition were startling or unexpected. The new materials shown were modifications of existing materials; the new applications shown were either similar to existing applications or were just one logical step beyond them.

Fibrous Glass

One of the trends most apparent to those who had attended previous plastics expositions was the growing importance of plastics materials re-

If you were not present at the 5th National Plastics Exposition, the accompanying analytical report will give you a quick, condensed view of the most important and significant developments in applications, materials, and machines that were on display. If you were at the show, it is hoped that this compact report will serve to supplement your own observations.

inforced with fibrous glass. Such materials, which played only a minor role in previous shows, were everywhere in evidence.

Two different sport cars with reinforced polyester bodies were among the most efficient crowdstoppers in the show. One of the cars, on display at the booth of Naugatuck Chemical Div., United States Rubber Co., has already been described in these pages.¹ A similar car was shown at the American Cyanamid Co. booth. Many observers, noting that one of the cars was displayed across the aisle from a 200-ton press made by Hydraulic Press Mfg. Co. for molding large reinforced plastic parts, commented that the coincidence might be prophetic of high-speed production of plastics car bodies by methods as yet only in the dream stage—methods that may someday compare in speed with the present methods of stamping out sheet steel.

Another large glass-reinforced piece was a 12-ft. jet engine shipping container shown in the booth of Bassons Industries Corp. At the other end of the size scale were some of the applications of Plaskon's glass-reinforced alkyd molding material. These applications included motor bushings, circuit breakers, blower housings, and an insulator bushing used by gas companies on pipe to prevent corrosion through electrolytic action.

American Cyanamid was displaying glass-reinforced polyester pipe made by three different manufacturers. American Cyanamid's exhibit also included many interesting glass-reinforced polyester molded pieces,

¹ See "Plastic Car Body in Production," MODERN PLASTICS 29, 96 (April 1952).

some of which had unusually thick wall sections. Thick reinforced polyester sheets and rods for applications involving machining were shown by Dynakon Corp. Included in the exhibit were specimens of sheet stock from $\frac{1}{16}$ to 1 in. in thickness and specimens of rod stock from $\frac{1}{4}$ to 1 in. in diameter.

*Vinyl—
Rigid and Plasticized*

Another material which has achieved new importance in the industry and which was much in evidence was rigid vinyl. This material, which was available from only one producer until comparatively recently, was being shown by practically all the producers of vinyl. End products made of hard vinyl are still relatively scarce, except for extruded pipe and sheet material for fabricating ducts, both of which were much in evidence at the show.²

Rigid vinyl was also involved in the Industrial Radiant Heat Corp. exhibit which perhaps attracted more continuous attention than any other small booth in the show. The product on exhibit was the company's machine for vacuum forming thermoplastic sheet. Most of the sheets being vacuum formed were rigid vinyl, although the suitability of the machine for forming polystyrene, styrene copolymer, acetate, and even thin acrylic sheets was also demonstrated. The machine exhibited was designed for manual operation and

² For a survey of the hard vinyls, see "The 'Hard Vinyls,'" MODERN PLASTICS 29, 87 (April 1952).

employed an infra-red super-heater to soften the thermoplastic sheet prior to forming.

The operation of the vacuum forming machine and the attention it attracted effectively dramatized the possibilities of this long-neglected process. The significance of the process as a possible alternative to injection molding for the production of large but essentially simple pieces was the subject of much comment. Some observers noted that the piece being formed was almost as large as the inner door of a refrigerator. Others spoke of the possibility of extruding a thermoplastic sheet and vacuum forming it, while still warm, as fast as it is extruded, thus creating a production set-up with vast possibilities for high speed output of numerous end products.

In the soft vinyls, the new developments were less startling. Firestone Plastics Co. announced a number of new resins now in the pilot plant stage which are expected to be in full-scale production in the near future. They included: Exxon 400 XR-61, a fluorinated thermoplastic resin with excellent chemical and aging resistance; Exxon 800 XR-60, a rigid material; Exxon 700 XR-59, a latex containing a vinyl chloride polymer of high solids concentration; and Exxon 600 XR-54, a paste resin.

Blow extruded thin vinyl film was shown by Naugatuck Chemical Div., United States Rubber Co. The process yields as much as 50 sq. yd. of 3-mil film per lb. of raw material.

Monsanto Chemical Co. showed a flexible inlaid-pearl Ultron sheet material produced in 23 by 54-in. sheets by an undisclosed process.

Another trend apparent in the vinyls was the tendency to use plastic fasteners for raincoats and other items made of vinyl film. The extruded vinyl slide fastener introduced last year by Flexi-Grip Co.³ was on display at the booth of Gering Products, Inc. Another extruded vinyl slide fastener was introduced at the Show by World Plastex.

A molded elastomeric vinyl button which can be heat sealed to vinyl raincoats was shown for the first time by Mayflower Electronic Devices Inc. The new button is stronger than sewn buttons and can be put on

at the rate of 85 to 100 doz. per day per operator as against 45 doz. per day per operator for sewn buttons.

Surface Effects

No summary of the vinyls shown in Philadelphia would be complete without some mention of the obvious improvements in surface effects by embossing, printing, and combinations of embossing and printing. In fact, one of the strongest trends observable at the show was the progress of vinyls, film and sheeting, supported and unsupported, in a variety of patterns with fabric-like textures only distantly related to the plain glossy finish—the only one available just a few years ago.

But the greatly improved surface effects apparent at the show were not restricted to the vinyl field. Metallized acetate sheet was being shown in many intricate embossed patterns which added immeasurably to the material's decorative qualities.

The automobile bodies already mentioned also had surface finishes which were far superior to those usually found on pieces made of reinforced polyester. Only on close inspection was it apparent that the bodies were not metal. This was significant in that the molded parts' appearance has held up many of the material's potential applications.

In injection molded parts, too, new surface effects were obvious. Molded styrene wall tile with a surface like that of striated plywood was being shown, as were also picture frames with a similar surface. Other frames of styrene were covered with flock after molding.

Foamed vinyl with a flock backing was also being shown. This material is said to have great possibilities for upholstery, throw rugs, bed-spreads, drapes, and the like.

Styrene and Styrene Copolymers

Styrene copolymer sheet materials and their applications were much in evidence, as was styrene copolymer pipe. U.S. Rubber an-

nounced a new sheet material, called low temperature Royalite EBMU, which is said to withstand high impact at low temperatures. And those exhibiting styrene copolymer pipe indicated that the problem of brittleness at low temperatures had been solved insofar as pipe was concerned. Bakelite Co. announced three new formulations of styrene modified with rubber.

Some observers were impressed by the improved appearance of Royalite and Boltaron styrene copolymer sheet materials and by the deep draws accomplished successfully on a production basis by some fabricators. One interesting application soon to be marketed was a pedal-powered toy car with a one-piece body formed of Royalite. Such a large formed piece was foreseen in the March 1952 "Plastics Futures" issue of *MODERN PLASTICS*.

In styrene molding materials, there was a noticeable lack of announcements of new materials. About the only such announcement was Monsanto's Lustrex LH, an impact resistant material with a glossiness previously unobtainable in impact resistant materials. The material, according to Monsanto, is 50 to 100% more durable than general purpose styrene.

Among the molded styrene applications shown, battery cases were conspicuous for their number and size. The Koppers Co. exhibit included a new battery case which is one of the largest pieces ever injection molded. The case, molded of transparent material by Prolon Plastics, weighs 14 pounds. Another interesting large piece was the refrigerator door liner which was molded in one piece by Amos Molded Plastics.⁴

Phenolics

Exhibits of the phenolic producers placed major emphasis on those applications in which the material has already proved itself. There was a plethora of electrical parts, large television set housings, shell molds, wood waste boards, resin-bound sand foundry molds, etc. Perhaps the (Continued on p. 187)

³ See "Extruded Slide Fastener," *MODERN PLASTICS* 29, 79 (Sept. 1951).

⁴ See "The Biggest Yet," *MODERN PLASTICS* 29, 107 (April, 1952).



Light weight, sturdy nylon vacuum cup permits bed patients to feed themselves, is also adaptable to administering liquids to semi-conscious persons



Liquid is drawn orally from spout of cup and ceases to flow when patient stops drawing; cup's tilt does not affect flow

Feeding Cup for the Sick

DIFFICULTIES of administering liquids to the sick, particularly if they are too weak to be raised to a sitting position, can be overcome with the Wonder-Flo vacuum cup, developed by W. W. Rice of the Rice Research Laboratories, Chicago, Ill. The 8-oz. cup consists of two molded nylon parts—the tumbler itself and a tight-fitting patented top having a tapered spout or mouthpiece that fits the lips comfortably, so that liquids can be drawn through the $\frac{1}{8}$ -in. opening. Vertical grooves and a flaring shoulder make it easy to hold the cup firmly. The top section, which inserts more than $\frac{1}{2}$ in. down into the tumbler for an air-tight fit, has an opening molded-in the upper surface that is plugged by means of a removable hollow "control button" of gum rubber. This button creates the vacuum that makes the cup nonspillable; reduces belching, gagging, and air-swallowing; and permits feeding the semi-conscious.

For routine use, patients need not touch this button. They draw out the liquid themselves, as they would from a nursing bottle, and no matter how the cup is tilted, the liquid stops flowing as soon as the patient stops drawing. Of special interest to hospitals are the sanitary features of the tumbler, its light weight, and the fact that the virtually unbreakable cup withstands all types of sterilization, including autoclaving. Also, the

vacuum cup eliminates costly glass and feeding tube breakage.

All required fluids, including thick soups and broths, may be given to patients with this type of cup, even without raising the patient's head from the pillow. The cup is also designed to "slo-drip" automatically, one drop at a time, to stimulate the salivary reflexes. Ideal for the night table, the non-spill cup also serves as a handy companion for picnics, auto trips, etc. With the top removed, the tumbler may be used for feeding gruels and cereals to infants.

The all-nylon vacuum cup, al-

though sold primarily for hospital and sickroom use, is also separately packaged and sold as an infant feeding and training cup. The cup is also made in another version, consisting of polyethylene base and brightly colored styrene top, as a training cup for babies. This cup, which works on the same principle as the all-nylon model but cannot be boiled or autoclaved, sells at a lower price. Hauser Products, Inc., Chicago, molds the nylon and styrene components, while the polyethylene part for the training cup is made by Republic Molding Corp., Chicago.

Nylon cup is molded in two parts—tumbler (left) and tight-fitting top (right) with spout and molded-in opening for a button (center) to control flow of the liquid



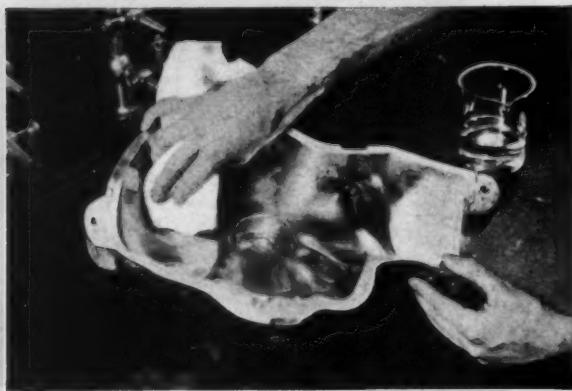


X-ray treatment techniques are demonstrated with model of head. Internal anatomy (bottom right) is visible through translucent epoxy type phenolic casting (top left). Piped light (bottom left) indicates pathway to the diseased areas, located by embedded lights (top right)

All photos on these two pages courtesy Bakelite Co.

First step in casting operation is to coat aluminum mold of head with solution of paraffin in toluene. Mold was formed from life-size plaster model

Prepared epoxy type phenolic casting syrup is poured into a hole in the neck of the assembled mold at 55° C.



Radiation Demonstrator

Epoxy type phenolic casting of human head is used to teach x-ray techniques. Piped light dramatizes the lessons

TECHNIQUES of beaming x-ray radiation at internal cancers and tumors in the head area are demonstrated to doctors and radiation therapists with a full-size translucent model of the human head cast from Bakelite C-8 resin, an epoxy type phenolic made under U. S. Patent 2,505,486. Beams of light directed through the translucent material spotlight different portions of the head anatomy which are molded into the model. Dr. Rieva Rosh, Assistant Professor of Radiology, New York University College of Medicine, conceived the demonstrator and Dr. Oscar H. Cohen, Bellevue Hospital, New York, designed it.

The translucence and natural bronze color of Bakelite C-8 resin gives the model realistic depth. The exceptional light and heat resistance of the material prevent the model from deteriorating when light is beamed through it, and its high refractive index makes the path of light distinct. In addition, the epoxy has high dimensional stability, good dielectric properties, high impact strength, unusual resistivity at high humidities and temperatures, resistance to most inorganic chemicals.

The model was cast at Bakelite's Bloomfield, N. J., laboratory in two aluminum molds that are made by M. A. Cuming & Co., New York, N. Y. To arrive at the aluminum molds, a clay model of a head was made. Then plaster was poured around this prototype. After hardening, the plaster cast was split vertically in profile through the base of the nose. The hardened clay was removed and the two cavities filled with plaster. Guided by x-rays and diagrams of the head, outlines of the principal internal anatomical features were produced on two flat aluminum plates, one for each mold. The aluminum mold and plates were formed using standard sand foundry techniques.

The inner surfaces of the aluminum molds and the flat plates were then coated with a solution of paraffin in toluene. This was allowed to dry and then wiped with a Dow Corning silicone which acts as a mold release. The two halves of the mold were then clamped individually to their flat plates, with a 0.006-in. Vinylite gasket used to seal the joints.

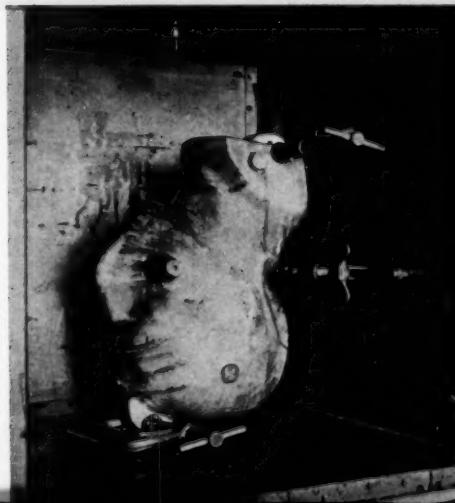
The casting syrup was poured into

a hole in the neck of each assembled mold at 55° C. and allowed to cool at room temperatures for approximately 18 hours. After cooling, the following oven curing cycle was followed: 55° C. for 8 hr.; 60° C. for 16 hr.; 80° C. for 6 hr.; and 100° C. for 5 hours. When this process was completed, the oven was turned off and the compound slowly cooled to room temperature in the closed oven. The castings were then easily removed from the molds.

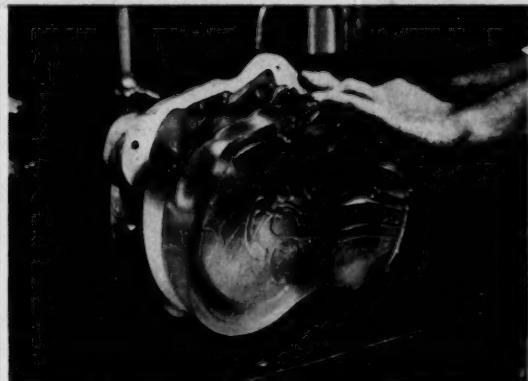
Embedded in one of the finished castings are five small battery-operated electric lights controlled by independent switches. These lights indicate the position of the areas of the head which are frequently cancer-contaminated—pituitary, posterior naso-pharynx, lateral aspect of the tongue, base of tongue, and vocal cords. For demonstration, one of these lights is turned on and a narrow beam of light is aimed at the illuminated area through the translucent model. This light beam, representing the directional cone on x-ray machines, is manipulated at the target from various angles, demonstrating different approaches to the diseased area.

The model stands about 20 in. high and is set on a revolving base pedestal which holds the wiring and control switches that operate the five embedded lights. Ordinary visible light is used in demonstration since the radiation beams used in treatment are invisible by ordinary methods and potentially harmful to observers.

After cooling at room temperature for 18 hr., mold undergoes oven curing cycle for 35 hr. at varying temperatures



After oven curing cycle is completed, the compound slowly cools to room temperature. The casting is then easily removed from the mold



FLASH-HOLDER DEPENDS ON PLASTICS

Important to photographers are the look, feel, and performance of flash-holders; plastics contribute to every phase

by H. L. MALONE*



IN ANY press or commercial photographer's life the flash-holder he uses plays an important role. It must "look" right because it is one of the emblems of his profession; it is a piece of equipment which, in part, marks him as something other than an amateur. Then, too, it must "feel" right because if it doesn't, it will always interfere with his concentration on his work. Finally, and most important of all, it must perform perfectly—under all circumstances and conditions—or else it will be of no use to him whatsoever.

As a result, when Eastman Kodak Co. recently designed its new Kodak Ektalux Flashholder system, considerable thought and care was given to the selection of materials which would look, feel, and perform cor-

* Project engineer, Eastman Kodak Company

rectly under all conditions. For this reason a large number of the parts of the new Flashholder and its extension units were made of plastics, the particular type being determined by the requirements of the part to be molded.

Specific Parts

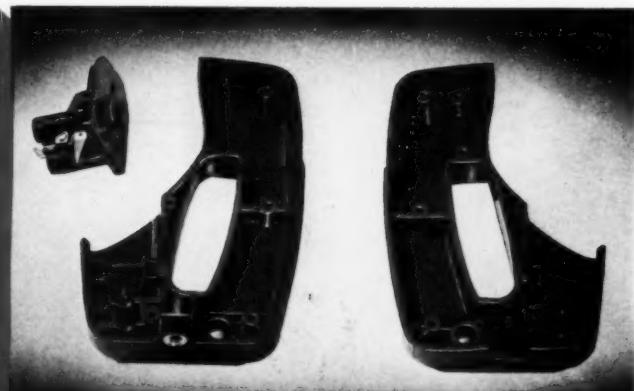
In the Flashholder itself, the handle inserts of the new "saw grip" handle are made of Tenite II cellulose acetate butyrate, as are the ejector and solenoid switch buttons and the plastic insert core in the small lamp socket. All of these pieces are molded by Quinn-Berry Corp., Erie, Pa. Both of the handle inserts are produced in 4-cavity molds, the ejector button in a 12-cavity mold, and the solenoid switch button in an 8-cavity mold. The plastic insert for

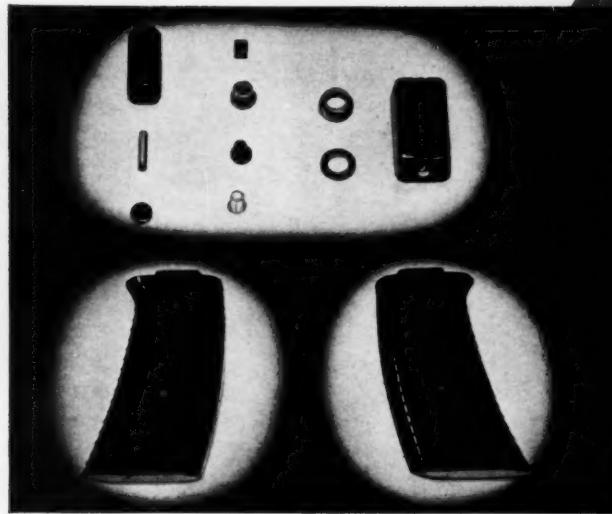
the small lamp socket is made in a 12-cavity mold.

Butyrate was chosen for these applications because of its fine glossy finish, its impact resistance, and its excellent color properties. The material also has an excellent "feel" which is exceedingly important because of the amount of use and handling it receives.

The extension Flashholder is almost completely made of butyrate, in contrast to the Ektalux Flashholder itself which is of cast magnesium with only Tenite handle inserts. The extension flash unit is produced in two pieces which are fastened together with screws. Each half of the unit is molded separately in a 2-cavity mold. The lamp socket insert in this case is made of Bakelite phenolic in a single cavity mold. All

Left: Assembled extension Flashholder. Below: Component parts of the handle, showing bosses and reinforcing ribs. Small insert at left fits into handle and is part of bulb socket and ejector





Right: Main unit of Ektalux Flashholder system has handle inserts of butyrate. Left: The two handle inserts and other plastics components, including the ejector and solenoid switch buttons, the insert for the small lamp socket, and the lamp adjustment button

of these pieces are produced by Waterbury Companies, Inc., Waterbury, Conn.

Change in Materials

The connectors on the extension cords are made of butyrate and are designed to stand up under heavy usage and to protect the vital electrical connections without adding excess weight and bulk to the units. Although it had been planned to use polyethylene in molding these connectors on metal bodies, with the wires mechanically clamped under and soldered to the body, this original plan was shelved when government limitations were placed on the use of polyethylene. Consequently, the design was changed to permit the use of butyrate. This material was found to be admirably suited to the purpose because of its toughness, resistance to scuffing, etc. These connectors are molded at Kodak's Camera Works Div. where the assembly of the Kodak Ektalux flashholders is also done.

In the electrical system for the Flashholder, phenolics are used as insulation plates. Butyrate is also used in insulating sleeves for the extension terminals. Phenolic plugs serve as insulators on the shutter and solenoid terminals while the condenser and resistor assemblies are dipped

in vinyl lacquer to give good insulation with small diameter. The battery plates are phenolic also to provide insulation, while in the solenoid switch the two elements are separated by phenolic plates. Phenolic sleeves are used to insulate the large lamp center contact from the magnesium casting.

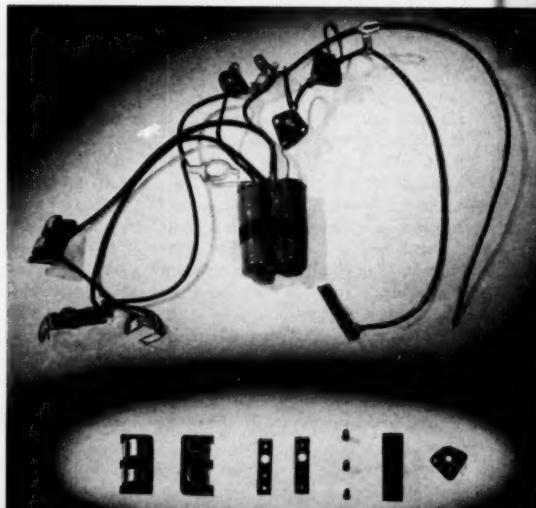
The core for the small base lamp socket is made of butyrate, while the "stop" pin or the center contact plunger for this assembly is a small phenolic rod.

The control or lamp adjustment button for the small lamp socket, made of butyrate, is used to vary the light spread from flat to normal as desired.

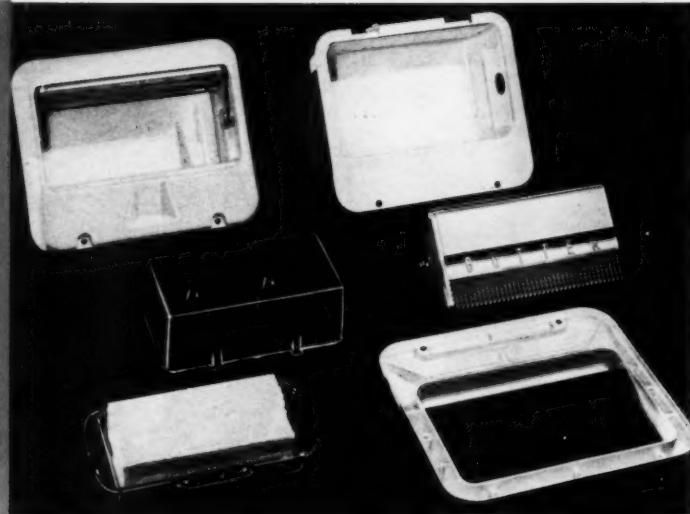
A nylon sleeve is used to insulate one of the synchro switch lead terminals. Nylon was chosen in this case because of its resiliency and toughness—qualities which are needed here to make the terminal fit tight enough to prevent the terminal from turning when the terminal screw is inserted.

All illustrations courtesy Eastman Kodak Co.

Right, top: The complete electrical system for the Flashholder. Bottom: Separate units used in the assembly. Most of the plastics applications here are for electrical insulation. Condensers in center of picture are insulated by vinyl lacquer



Keeping Butter Better



Styrene tray and cover (lower left) are used in a molded styrene butter compartment (upper left) which mounts directly into refrigerator inner door liner and is backed up by heating unit for keeping butter at proper consistency. The three styrene parts of compartment (right, from top to bottom) are liner into which swinging door fits; transparent door section; outside front frame

Heating coils in molded styrene compartment for Admiral refrigerator door maintain butter at proper spreading consistency

AMONG the many attractive and functional applications of plastics in the 1952 Admiral refrigerators is the molded styrene butter keeper compartment, which mounts directly into the inner door liner.

The compartment consists of three principal parts—the outer frame which forms the front of the unit; the liner, measuring $7\frac{1}{2}$ in. by $6\frac{1}{4}$ in. by $2\frac{3}{4}$ in.; and the door, mounted so that it swings back into the compartment when lifted. The two larger components are of white styrene, while the door is of clear transparent styrene, painted on the reverse side.

On some of the Admiral 1952 models, the butter compartment temperature may be regulated by means of an adjustment knob. On other models, the variable control is eliminated but concealed heating coils automatically keep the butter at proper spreading consistency.

Used in conjunction with the com-

partment are a clear styrene butter tray and lift-off cover which will accommodate a full lb. of butter. The tray has wide, curving flanges at each end, making it easy to pick up and pass, as well as a front flange which facilitates removal of the tray from the refrigerator.

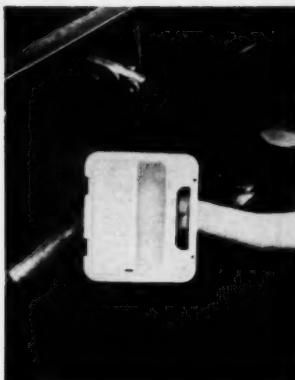
The Admiral butter compartment illustrated in the accompanying detail photo is molded and assembled by Sanko Mfg. & Tool Co., Chicago, Ill. The frame and the door of the unit are each molded in two-cavity molds on 8-oz. machines; the liner is produced in a single cavity mold. Openings cored at each end of the liner form integral bushings for the flat, circular lugs molded on the flanges at each end of the compartment door. Clear transparent tray and cover are made in 2-cavity molds.

The front frame of the butter compartment, having an inner edge which mates with a recess in the

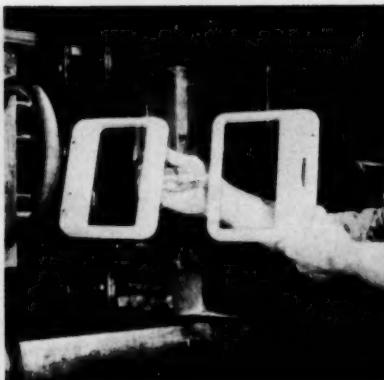
liner, is designed with a number of inner reinforcing ribs for added strength and rigidity. Sanko assembles these two parts by means of a cementing operation. The door carries the word "Butter" debossed on the reverse side, set off by a diamond grid panel. The back surface of the door is decorated by means of a masking and spraying operation.

The door is so designed that it may be snapped into position by compressing the ends slightly, requiring no metal attachments or special assembly operations.

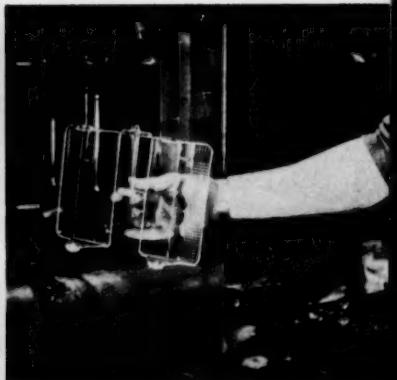
At the Admiral plant in Galesburg, Ill., the pre-assembled butter conditioners are mounted in the inner door panel by two Phillips head screws through cored openings at the bottom of the frame. Concealed undercutts on the top of the inner section anchor the compartment into the door liner at the top without additional fastening means.



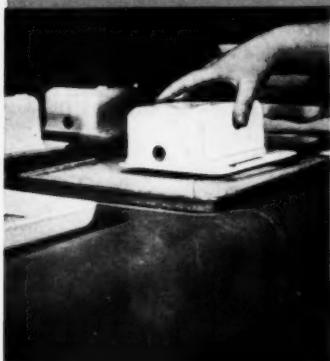
Styrene liner for the batter compartment is produced in single cavity mold



Outer frame which forms the front of the unit is molded in 2-cavity mold on 9-oz. machine



Clear styrene door, later spray painted for color harmony, is made in 2-cavity die



Liner (right) is pressed into tray of solvent, then cemented to frame (left)



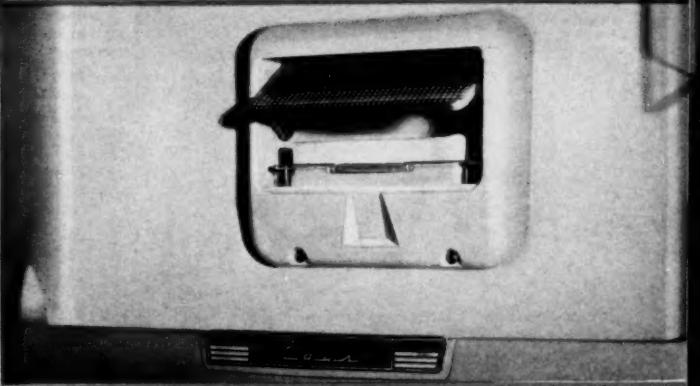
Styrene door is snapped into the liner by compressing the end flanges slightly



Tissue-wrapped clear styrene batter tray is packed for shipping with complete unit



All photos above courtesy Sinto Mfg. & Tool Co. Shipping carton, with clothed dividers to prevent damage, provides for thirty units



Courtesy Admiral Corp. Unit is mounted to door frame by two Phillips head screws through pre-drilled openings of frame's bottom; the top is obscured by concealed undercoat

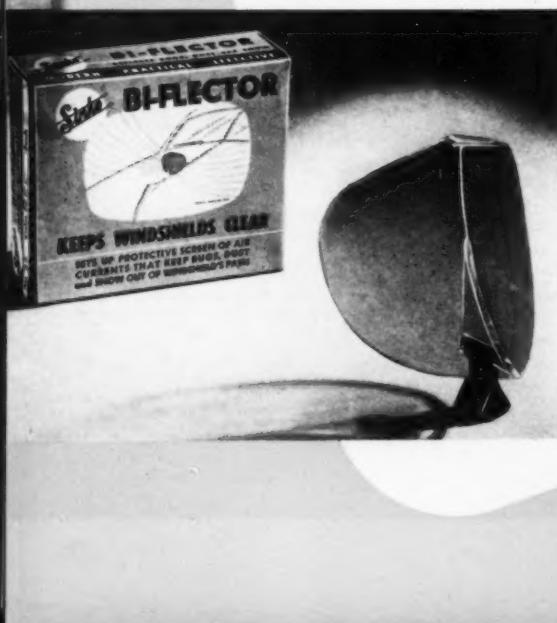


PLASTICS PRODUCTS

The appearance of a massive metal bracelet, without the weight of metal, is attained by fabricating the bracelet of cast phenolic and plating it with 24 carat gold. The bracelet is made in two halves, which are assembled in retail store to customer's order by attaching spring hinge. Made by Caddie Accessories, Inc., 25 W. 34 St., New York 1, N.Y.

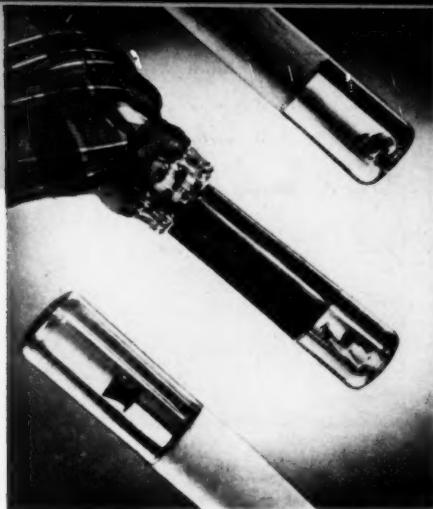
Wall type bottle opener has body molded of Plaskon alkyd and metal piece which bears the strain of removing bottle caps. The plastic body transforms the opener into a colorful, attractive unit and protects hands and clothes from catching on the sharp edges of the metal. Made by Colonial Mercantile & Mfg. Co., 1715 Mansfield Rd., Toledo 13, Ohio.

Air currents created by plow-shaped styrene deflector keep bugs, dust, or snow from hitting automobile windshield. The 5 by 4½-in. deflector has a stainless steel mounting clamp which can be attached to hood ornament or molding. The deflector is molded in five colors by Sinko Mfg. & Tool Co., 3135 W. Grand Ave., Chicago 22, Ill.

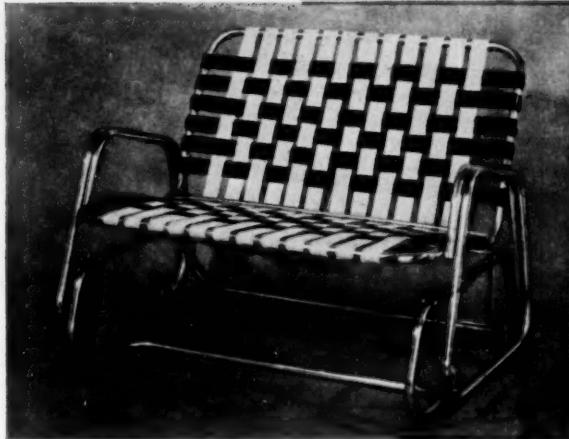


Unusual ball point pen slips over the end of the index finger like a thimble. It thus does not have to be grasped in the hand and cannot cause writer's cramp. User can shuffle papers without setting the pen down. The pen, called the Thim-Ball, is molded of Tenite II cellulose acetate butyrate and has a retractable point. Made by A. J. Carlson, Inc., 830 Bancroft Way, Berkeley, Calif.





Child's umbrella has hollow handle molded of Tenite I cellulose acetate. Figure of Rudolph the Red-Nosed Reindeer floats in clear liquid in the handle, moves around as the umbrella is tilted. Handles molded by Progressive Products, Inc., 701 Lehigh Ave., Union, N.J. Umbrellas (in adult size also) made by Columbia Umbrella Co., 863 N. Queen St., Lancaster, Pa.

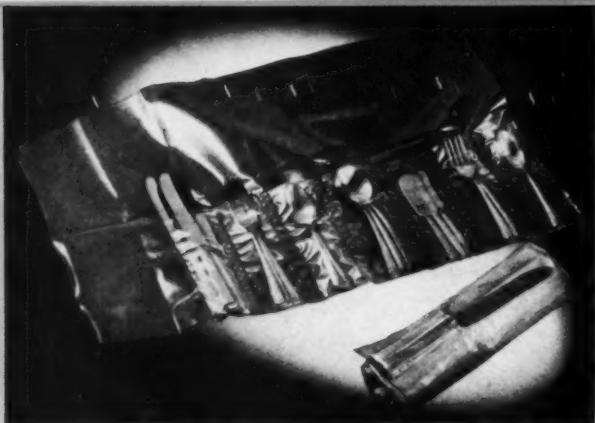


One- and two-passenger gliders with aluminum frames have seats and backs made of Velon woven saran webbing. The chairs are thus light in weight, completely resistant to all types of weather, and can easily be washed. Made in solid colors and two-tones by Lawnlite Co., Opa Locka, Fla.

Dispenser molded entirely of styrene holds roll of paper towels and roll of wax paper or aluminum foil. Openings in front allow user to see when supply is running low. Front of dispenser is hinged at bottom, opens for easy reloading. Cutting edge for wax paper is molded-in. Combination dispenser is molded by Loma Plastics, Inc., 3000 W. Pafford St., Fort Worth, Tex.



Wide-necked funnel molded of phenolic fits over rim of paint can so that drippings from brush go back into can instead of dripping down the outside of can or filling up the groove in rim. Can can thus be re-sealed and no skin is formed. Device, called Paint-Boy, has wire handle which locks under rim of can. Made of black phenolic to fit quart and gallon paint cans by Norloc Div., Norton Laboratories, Inc., Lockport, N.Y.



Compartmented pouch made of 4-gage polyethylene film holds 36 pieces of silverware and protects them from tarnish and scratches, thus ending need for frequent polishing. When silverware is placed in compartments, the pouch can be rolled into a small air-tight bundle which can be stored in a drawer. Pattern can be identified through film. Made by Comet Envelope & Paper Co., Inc., 5 E. 17 St., New York 3, N.Y.



Tire valve caps molded of nylon afford positive air-tight seal, will not break or chip, will not rust or corrode, and are unaffected by exposure to weather. Threads will withstand the wear of repeated removal and replacing. The caps are made in three types: dome type, screw-driver type, and "easyflate" type which need not be removed when inflating the tire. Made by The Dill Mfg. Co., 700 E. 82 St., Cleveland 3, Ohio.

Muff-type carry-all bag made of 6-gage vinyl protects purse, magazines, books, or packages in rainy weather. Large flap at the back opens so that items can be inserted; the weight of the items keeps the flap closed. Bag is transparent and purse can be opened inside the bag for access to money without exposing other contents of purse to rain. All seams are electronically sealed. Made of Vinylite by Helen Dering, 2301 Bay St., San Francisco, Calif.





Sturdy serving pitcher molded of styrene holds 80 oz. of liquid. Handle, bottom rim, and top rim are molded separately of contrasting colored material. Retainer piece molded as part of top rim keeps ice in pitcher while pouring. Molded in five colors, with gray trim, by The Plas-Tex Corp., P.O. Box 12396, Los Angeles 64, Calif.



Voltage tester housed in shatter-proof black Temite II cellulose acetate butyrate is small enough to fit in the pocket, rugged enough to be carried in tool box. Molding by The W-L Molding Co., 2015 Factory St., Kalamazoo, Mich., for Square D Co., 6060 Rivard St., Detroit 11, Mich.

PLASTICS PRODUCTS

Hat box molded of styrene can be used to store hats in the closet or to carry them when travelling. Extruded vinyl strap, fastened to box with metal grommets, serves as carrying handle and also keeps the cover in place. Body of the box is molded in one piece so that there are no seams or cracks. Available in transparent or opaque colors from The Henry Hanger Co. of America, Inc., 450 Seventh Ave., New York 1, N.Y.

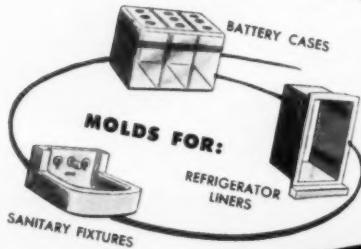
An accurately measured teaspoon of liquid can be dispensed easily and quickly from 4-oz. polyethylene bottle called the Measure-Well. When bottle is squeezed, well in closure fills with liquid. Hole from which well is filled is placed so that any excess is drawn back into bottle by suction when pressure is released. Snap-on cap, also polyethylene, covers the well when it is not in use. Made by Apesco, Inc., 79-81 Midland Ave., Garfield, N.J., with bottles by Plax Corp., Hartford, Conn.



TO GIVE YOU LARGER PLASTIC MOLDS
up to 60" x 28"!

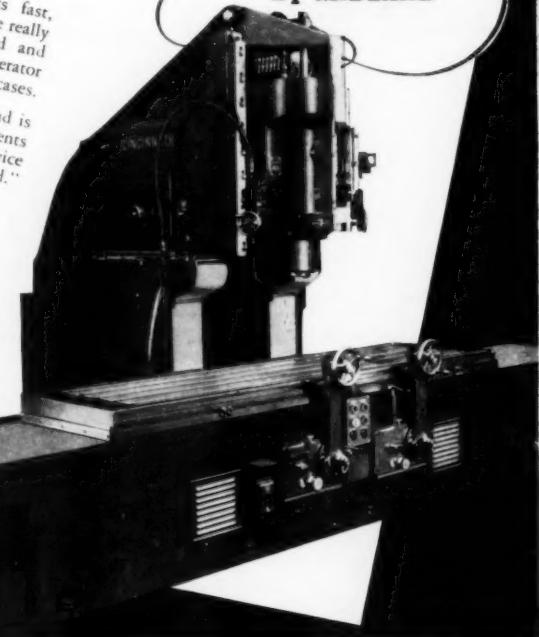
Here is another important addition to Midland's facilities . . . a new Cincinnati Hydro-Tel Milling Machine for plastic mold areas up to 1680 square inches . . . right in step with the plastic industry trend to ever larger molded pieces!

This high precision machine permits fast, economical production of molds for the really big plastic parts now being produced and planned for the near future . . . refrigerator door liners, cabinets, sinks and battery cases. Long famous for hobbed cavities, Midland is ready to meet all of your mold requirements . . . ready to give you fast, dependable service when you specify "Plastic Molds by Midland."



PLASTIC MOLDS

by MIDLAND



MIDLAND DIE AND ENGRAVING COMPANY

1800 W. Berenice Avenue • Chicago 13, Illinois

Makers of Plastic Molds • Die Cast Molds • Engraved Dies •
Steel Stamps • Hobblings • Pantograph Engraving



F. B. Stanley, Engineering Editor

Current Techniques for the INJECTION MOLDING OF NYLON

by L. PAGGI†

IN THE past six years the use of molded nylon has increased tremendously. These uses today include many applications where plastics materials were not previously found. And since nylon is being molded in an increasing number of plants throughout the country, a discussion of up-to-date molding techniques is in order. The information presented here is based on accumulated experiences in molding plants and at Du Pont laboratories, with special emphasis on the high quality demanded by most current applications of nylon.

Molded nylon finds what is perhaps its most important field of application as an engineering material—in bearings, gears, cams, and other mechanical parts. Nylon is especially suited for such use because of its strength and toughness, form-stability at high temperatures, abrasion-resistance, unique bearing characteristics, and other properties. In addition, it frequently affords cost savings because of the economies of injection molding, and because of light weight (more parts per lb.) and superior performance.

Good quality and close tolerances are specified in most of the applications of nylon. Consequently, the injection molding operation must be performed with care. This does not mean that special and expensive or complicated equipment is required, but it does mean that close control of all variables must be exercised.

The nylon molding powder most widely used in injection molding is type FM-10001. This formulation has the highest softening temperature of

the commercial nylon molding powders, and products made from it can withstand continuous use at temperatures up to 250° F. or higher, depending on service conditions. Unless otherwise specified, the

molding material referred to in this article is FM-10001.

Successful molding of nylon requires consideration of certain basic factors. For example, nylon has a sharp melting point; this point is

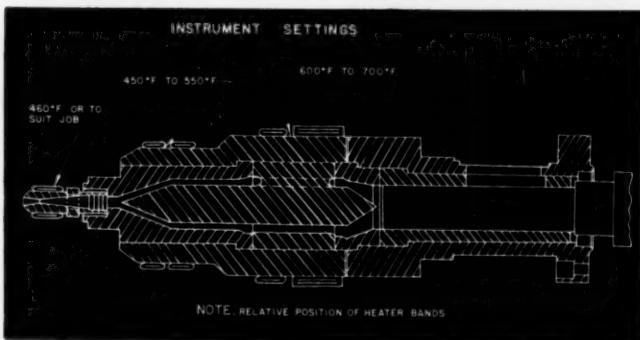


Fig. 1—For molding nylon in a machine with no heating band over the plunger section, it is recommended that a temperature of 600° F. or higher be maintained at the rear band

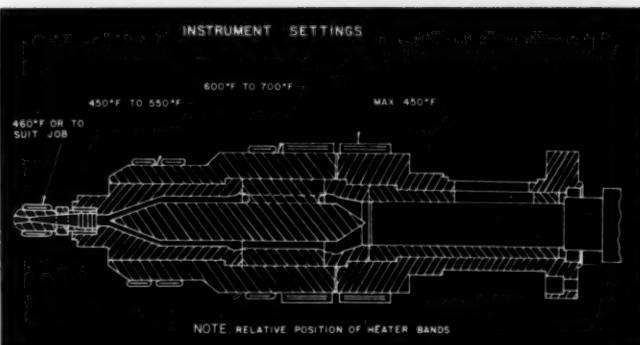


Fig. 2—When molding nylon on a machine in which the rear heating band overlaps part of the plunger stroke section, the rear band temperature should be only about 450° F.

* Reg. U. S. Pat. Office

† Field Service Laboratory, Polymers Dept., E. I. du Pont de Nemours & Co., Inc., Arlington, N.J.

about 487° F. for FM-10001. At molding temperature, it has a fluidity approximating that of a light lubricating oil. This low melt-viscosity is a major factor governing molding characteristics. It makes possible the molding of nylon in thin, tough sections (as thin as 0.010 inch). It also makes it necessary to modify conventional injection molding equipment and procedures when molding nylon.

The basic requirements for nylon molding equipment are: 1) availability of proper range and distribution of heat within the plasticizing cylinder; 2) a properly designed nozzle; 3) dry molding powder with a moisture content less than 0.25 percent.

The Injection Machine

Nylon can be, has been, and is being molded in conventional injection machines of all designs without alteration. However, the quality and dimensional accuracy of the molded piece are governed to some extent by the characteristics of the particular molding equipment used, which in turn affect the control that can be exercised over molding variables.

Plasticizing Cylinder—With a correctly designed nozzle and proper distribution of heat, injection cylinders of all designs can be used for

molding nylon. The optimum amount and distribution of heat varies with the design and size of the cylinder. In general, it is found that horizontal diverging-type cylinders (Figs. 1 and 2) and vertical cylinders can be heated to a higher over-all temperature than horizontal straight-bore cylinders. The horizontal straight-bore cylinder is limited in this respect by the fact that molten material may tend to flow back toward the feed hopper when temperatures appreciably higher than the melting point of nylon are used and when long delays between molding cycles are encountered.

Nozzle—Figure 3 shows a nozzle which was developed in Du Pont laboratories and which is recommended for molding nylon. Nozzles of this general design can be made to fit all types of machines.

The main feature of this nozzle is a reverse taper bore at least one in. in length. This, in effect, extends the sprue into the heated nozzle. This design permits operation of the nozzle at a lower over-all temperature, eliminates the likelihood of a hot spot at the rear of the nozzle, and provides good control over drooling. Any nylon that solidifies in the tapered bore during the molding cycle will be attached to the sprue and will be withdrawn with the shot.

This recommended nozzle should be provided with a heater band of sufficient wattage to maintain a temperature of at least 600° F. This band should be located as close as possible to the outlet of the nozzle and the sprue bushing, and should not exceed two in. in length. A longer heating band would develop a hot spot at the junction between the nozzle and the cylinder.

A nozzle filter, consisting of a steel plate with drilled holes $\frac{1}{16}$ in. in diameter, is recommended. The number of holes should be such that their combined areas will at least equal the cross-sectional area of the nozzle bore. An even greater number of holes helps to reduce back pressure at the filter. (Torpedo-type filters are not recommended because of the temperature limitations they place on the nozzle.) The function of the filter is to prevent unfused particles from entering the mold. Such unfused particles are not likely to be found when producing a small shot on a relatively large machine. However, unless the filter is used, they could cause trouble when molding at a rate in excess of one-half the capacity of the machine per shot per minute.

The filter is not needed to control drooling. Nor is it a filter necessary when molding FM-3001, FM-6501, FM-7001, or FM-8001 nylons, because these materials melt at appreciably lower temperatures than FM-10001 nylon and are more viscous in the molten state.

Figure 4 illustrates a nozzle of a type not recommended for molding nylon. A nozzle of this design must be operated at temperatures above 700° F. to prevent freeze-off between shots. At such temperatures, drooling cannot be controlled, and the molded articles tend to have a rough, splay-marked surface.

Shut-off Nozzles—At least one commercial machine is equipped with a nozzle having a mechanical shut-off. This type of nozzle has proved successful in molding nylon; in fact, it offers certain advantages when molding over inserts, or when very hot material is required at the front end of the cylinder, as when molding extremely thin-walled sections.

Injection Ram—The injection ram may be cored to permit cooling. This feature is incorporated in machines having close clearance be-

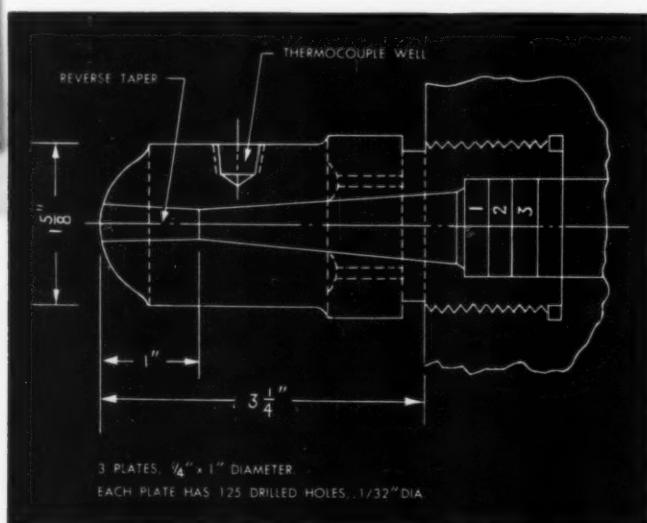


Fig. 3—An injection machine nozzle with a reverse taper bore is recommended for use with nylon. Nozzles of this general design can be adapted to fit all types of machines.

tween the cylinder wall and ram; in other machines it is not absolutely necessary except for extremely long cycles.

Injection Rate—Nylon should always be injected into the mold at high speed. Hence, it is recommended that a high-volume pump or "booster" be used. Operation of the ram at high speed is most valuable in controlling flashing in the mold. A high injection rate at relatively low pressures will fill the cavities without flashing, whereas low pressure and low injection rate may cause incomplete filling of cavities in some molds.

Molds

Special mold construction is not required for nylon. Any mold suitable for other thermoplastics is equally satisfactory for nylon. Although molten nylon is more fluid than other thermoplastics, it will solidify almost at the instant of contact with the relatively cold mold surface, thus eliminating any undue tendency to flash. When nylon does flash in molds in which other thermoplastics do not, the flashing can be attributed to more effective pressure within the mold because of the fluidity of the nylon. When flashing occurs, the line pressure should be reduced but the high rate of injection should be maintained.

Designing the Mold—The accuracy of dimensions in a molded article depends to a considerable extent on the dimensions of the mold cavity in which it is produced. Molds for articles which do not demand close tolerances can be designed by using data accumulated through experience or by allowing for a shrinkage of 0.010 to 0.040 in. per in., depending on the wall section of the article. When close tolerances are required, however, the following mold construction steps are recommended:

1) Using the specified dimensions, machine a single cavity in the mold-base intended for use in production.

2) Machine the sprue bushing and all runners up to the positions where the production cavities will be inserted. This will establish the time required for the material to reach the cavities.

3) By trial moldings in the single cavity, determine optimum runner and gate size (as described below).

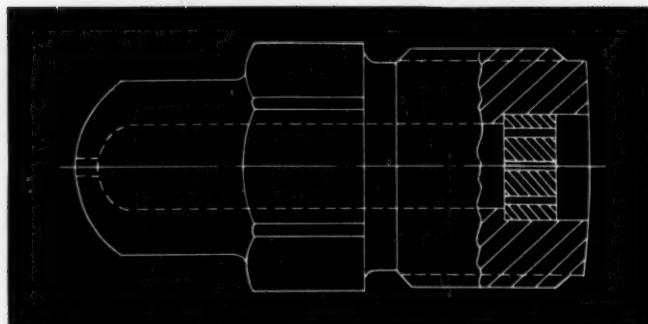


Fig. 4—This type of injection machine nozzle is not recommended for nylon molding. It requires high temperatures to prevent freeze-off, and drooling cannot be controlled

and determine the best molding conditions required to produce satisfactory parts.

4) Heat-treat the molded part for $\frac{1}{2}$ hr. at 350° F., and allow to cool slowly. (See section below on Heat-Treating.)

5) Check dimensions of the treated article after at least 24 hours. Note changes in any dimension.

6) Use shrinkage data thus obtained to adjust the dimensions of the production mold.

7) Machine production cavities to the correct dimensions, and insert into the production mold base that was used for the single-cavity test molding.

8) Mold under the conditions previously established, without altering the runners. Compensation for slight differences in dimensions can be readily made by altering molding conditions slightly. (See Table I.)

Certain generalizations can be made with respect to runners. As a rule, thin-walled parts require runners of small cross-section; heavier sections require proportionately heavier runners. In general, runners should be between $\frac{1}{16}$ and $\frac{3}{16}$ in. in diameter. For articles having a wall thickness of $\frac{1}{8}$ in. or less, runners need not exceed $\frac{1}{8}$ in. in diameter. For articles of heavier wall thickness, the diameter of the runners should usually be about $\frac{1}{2}$ to $\frac{3}{8}$ the thickness of the article, though not exceeding $\frac{3}{8}$ inch. Runners with greater diameters are not desirable, even for very heavy sections, because material in the nozzle may freeze off on extremely long cycles, making the feed ineffective.

An oversized runner feeding thin-

walled cavities will usually cause more trouble than an undersized runner. A large runner will be filled at low pressure up to the thin wall of the cavity, at which point flow halts momentarily until enough pressure builds up to break through the gate. Much higher pressure will be required to break through, which, in turn, is likely to cause flashing, or the delay may even cause the gate to freeze off.

The Molding Operation

Importance of Dryness in Molding Nylon—Although moisture is often desirable in a finished molding, because of its beneficial effect on toughness, it is very important that moisture be held to a minimum during the molding operation, when the nylon is in the molten state. Material molded or extruded with a moisture content above 0.25% will give moldings or extrusions with reduced toughness.

Nylon molding powders are hygroscopic; they readily absorb moisture from the air. Rate of absorption is accelerated when atmospheric humidity is high and when a relatively large surface of nylon powder is exposed to the atmosphere as, for example, when spread thinly in unheated trays. Open containers will permit greater moisture-absorption than closed ones. Also, nylon placed in non-moisture-proof containers will pick up moisture through the permeable walls of the container. The molding powder should therefore be stored in covered moisture-proof containers. Hoppers of machines should also be covered. Warm nylon will not pick up

Table I—The Effect of Molding Conditions on Dimensions of Nylon Moldings

No.	Cylinder temperature, °F.	Injection pressure, P.S.I.	Ram time in seconds		Mold temperature	Dimensions after molding in inches		Dimensions after heat treating @ 350° F.								
			Forward	Back		I.D.	Length	I.D.	Length							
1	600	480	500	10,000	20	10	Fast	100° F.	1.014	±.001	.970	±.0015	1.000	±.000	.974	±.0018
2	600	480	500	10,000	20	10	Slow	100° F.	1.014	±.0005	.967	±.0015	1.000	±.001	.964	±.001
3	600	480	500	20,000	20	10	Fast	100° F.	1.017	±.0005	.966	±.0015	1.000	±.001	.962	±.0015
4	600	480	500	20,000	20	10	Slow	100° F.	1.015	±.0005	.961	±.001	1.003	±.001	.978	±.001
5	600	480	500	20,000	10	5	Fast	100° F.	1.008	±.001	.975	±.001	1.003	±.001	.975	±.001
6	600	480	500	20,000	10	5	Slow	100° F.	1.005	±.0005	.971	±.001	1.000	±.000	.969	±.0005
7	650	550	500	10,000	20	10	Fast	100° F.	1.014	±.001	.979	±.002	1.003	±.001	.976	±.0015
8	650	550	500	10,000	20	10	Slow	100° F.	1.014	±.0005	.960	±.002	1.004	±.001	.977	±.002
9	650	550	500	20,000	20	10	Fast	100° F.	1.018	±.002	.990	±.002	1.009	±.002	.965	±.002
10	650	550	450	20,000	20	10	Slow	100° F.	1.017	±.0005	.967	±.0015	1.006	±.0005	.962	±.0005
11	650	550	450	20,000	10	5	Fast	100° F.	1.000	±.001	.980	±.0015	1.006	±.001	.978	±.0015
12	650	550	450	20,000	10	5	Slow	100° F.	1.008	±.0015	.977	±.0015	1.002	±.0015	.975	±.001
13	700	550	440	10,000	20	10	Fast	100° F.	1.014	±.0015	.962	±.0015	1.005	±.0005	.979	±.001
14	700	550	440	10,000	20	10	Slow	100° F.	1.015	±.0005	.961	±.0015	1.006	±.001	.977	±.001
15	700	550	440	20,000	20	10	Fast	100° F.	1.019	±.001	.990	±.001	1.011	±.001	.965	±.001
16	700	550	440	20,000	20	10	Slow	100° F.	1.017	±.0005	.989	±.001	1.010	±.0005	.984	±.0015
17	600	480	490	20,000	20	20	Fast	70° F.	1.024	±.000	.992	±.001	1.000	±.0005	.986	±.001
18	600	480	490	20,000	20	20	Fast	100° F.	1.023	±.001	.989	±.0005	1.000	±.0005	.986	±.0005
19	600	480	490	20,000	20	20	Fast	150° F.	1.020	±.001	.990	±.001	1.010	±.0005	.986	±.001
20	600	480	490	20,000	20	20	Fast	200° F.	1.011	±.002	.984	±.002	1.006	±.002	.983	±.001

* Each horizontal row of data represents the average of 60 moldings.

* For Ram speed, the term "fast" refers to the maximum speed resulting from the use of a booster; "slow" refers to conventional ram speed.

* Measurements of dimensions were made one week after molding.

Table II—Effects of Molding Variables on Shrinkage of Nylon

In this summary of Table I, there is only one variable in each group of data.

No. refers to a horizontal line of data in Table I.

Shrinkage represents the difference in dimensions of the molded piece (before heating) and dimensions of the mold cavity.

Cylinder temperature is expressed as rear-front-nozzle.

Variable: Cylinder Temperature			Variable: Ram Time (Cycle)			Variable: Ram Speed			Variable: Injection Pressure			Variable: Mold Temperature		
No.	Cylinder Temp., °F.	Shrinkage, mils	No.	Ram Time, sec.	Forward	No.	Ram Time, sec.	Forward	No.	Pressure, lb./sq. in.	Shrinkage, mils	No.	Mold Temp., °F.	Shrinkage, mils
1	600-480-500	20	3	20	10	13	20	10	1	10,000	20	17	70	10
7	650-550-500	20	5	10	5	11	10	5	2	20,000	20	26	100	14
13	700-550-440	20	9	20	10	11	10	5	4	600-480-500	20	16	100	10
2	600-480-500	20	6	20	10	10	20	10	3	650-550-500	20	19	100	10
8	650-550-500	20	6	10	5	12	10	5	5	700-550-440	19	26	100	20
14	700-550-440	19	10	20	10	10	20	10	14	600-480-500	17	19	100	14
3	600-480-500	17	4	20	10	15	20	10	9	650-550-500	16	10	100	10
9	650-550-500	16	10	20	10	10	20	10	10	700-550-440	15	17	100	13
15	700-550-440	15	10	20	10	13	20	10	16	600-480-500	17	11	100	11
4	600-480-500	19	19	20	20	14	20	20	14	650-550-500	20	30	100	33
10	650-550-500	17	20	20	20	10	20	20	15	700-550-440	19	21	100	21
16	700-550-440	17	11	20	20	10	20	20	16	600-480-500	19	19	100	19
Conclusion: Higher cylinder and nozzle temperatures give less shrinkage.			Conclusion: Longer cycles give less shrinkage.			Conclusion: Faster filling gives less shrinkage.			Conclusion: Lower mold temperatures give less shrinkage.			Conclusion: Lower mold temperatures give less shrinkage.		

Conclusion: Higher injection pressures give less shrinkage.

moisture as readily as nylon at room temperature. Nylon at still lower temperatures, such as material from a cold storage room, will pick up moisture very rapidly on exposure to the warm air of the work room by condensation on the surface of the granules. The importance of feeding warm material into the machine is therefore evident.

Excessive moisture content in the granular nylon being molded or extruded will cause the following troubles: a) excessive drooling at the nozzle; b) splay marks on the surface of molded items; c) reduced toughness; d) porosity; e) poor control of dimensions.

Elongation is one measure of toughness, and the following table shows the effect of moisture in the molding powder on elongation of the molded article:

Moisture	Tensile strength	Elongation
%	lb./sq.in.	%
0.38	10,400	56
0.25	10,400	67
0.20	10,500	109

The rate of moisture-absorption of nylon, when exposed to 50 and 100% relative humidity, is shown in Fig. 5. Here it can be seen that, within 30 to 60 min., nylon can absorb almost 0.1% moisture. This may raise the total moisture content to a level high enough to cause some of the problems listed above.

Tray Driers—It is recommended that, when nylon is removed from the sealed shipping container, it be

Treat it ROUGH!

PLASKON Fiber-Glass Reinforced ALKYD

Tough new plastic withstands extremely high impact; provides excellent dielectric properties and outstanding dimensional stability.

Now! A new plastic, Plaskon Fiber-Glass Reinforced Alkyd, has opened a whole new field of possible applications for plastics! This amazing material, a combination of glass fibers and heat-resistant polyester resin, is offered as a compound ideally suited for molding on conventional compression or transfer equipment. Molded, it possesses these unusual advantages:

1. Exceptionally high impact strength — tough and rugged — has three times the resistance of commonly used impact molding materials.
2. Superior dimensional stability — minimum after-shrinkage — allows pieces to be designed and molded to very precise specifications.
3. Excellent dielectric characteristics, including arc resistance.
4. Higher heat resistance than previously used impact materials.

Plaskon Fiber-Glass Reinforced Alkyd promises important advantages to makers of such products as electric motor parts, textile equipment, switchgear, automotive and appliance components, and many mechanisms now utilizing metal as structural material. For information on this new plastic molding compound, write for Bulletins A-10, A-11 and A-12 today!



PLASKON DIVISION

Libbey-Owens-Ford Glass Company
Toledo 6, Ohio

Branch Offices: Boston • Chicago • Los Angeles • New York

Manufacturers of Molding Compounds,
Resin Glues, Coating Resins

In Canada: Canadian Industries, Ltd. • Montreal, P.Q.

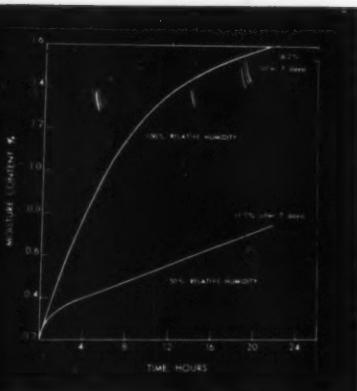


Fig. 5—Moisture absorption of FM-10001 powder at 50 and 100% RH

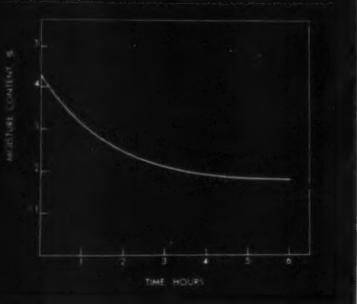


Fig. 6—Loss of moisture by FM-10001 molding powder in air oven at 175°F.

dried in a circulating air tray drier for a minimum of 3 hr. at 175°F. It is further recommended that the molding powder be placed in the trays to a depth of 1 inch. The rate of moisture loss of nylon dried at a depth of 1 in. is shown in Fig. 6.

Hopper Driers—In some extrusion and molding operations, it is necessary to consider the use of hopper driers rather than tray driers because of lack of floor space, or because a continuous drying method is preferred. If hopper driers are used they should be maintained as full as possible at all times and it is recommended that they be used only in continuous (24-hr.) operations. The rate of material consumption should be such that the material will dry in at least 6 hr. in a continuously operated hopper drier in which the air temperature is approximately 200°F.

Checking Moisture Content—Analytical methods of moisture determination are not always practical for use by the molder, because of the length of time required for each determination. However, an excess of moisture in nylon molding powder can be detected quickly by observing the frothing or formation of clusters of small bubbles which takes place when a number of nylon granules are heated on a hot surface. The degree of frothing increases appreciably with moisture content. This tendency makes possible a relatively simple visual method of checking moisture content of molding material direct from the drier.

The equipment consists of a Fisher-Johns melting point apparatus with an electrically heated aluminum stage, the temperature of which can be closely controlled. This apparatus can be purchased from supply houses such as Eimer and Amend, New York, N. Y., and A. C. Thomas, Philadelphia, Pa. If a Fisher-Johns melting apparatus is not available, a simple electrically heated aluminum block, thermostatically controlled, can be substituted. Such a melting block should be of sufficient size to accommodate at least five granules of nylon at one time.

The moisture determination procedure consists of placing nylon granules between glass cover plates on the hot stage, which is maintained at a constant temperature of approximately 50°F. above the melting point of the nylon. Type FM-10001 nylon melts at 487°F., ± 9 ; Type FM-3001 melts at 413°F., ± 4 . The molten nylon is then examined for the extent of frothing or bubbling. Dry nylon which should be satisfactory for molding or extruding will appear as in Fig. 7A. Nylon not sufficiently dry will froth as in Fig. 7B. The amount of bubbling or frothing is directly proportional to the moisture in the molding powder.

Molding Temperatures—Nylon can be molded at cylinder temperatures of 520 to 720°F. The choice of temperature will be based primarily on the quantity of nylon to be melted and on the cross-section of the article being molded.

In many cases, the use of higher molding temperatures (600 to 700°F.) improves the properties of the molded piece (especially toughness),

permits the use of smaller runners (hence gives less scrap and shorter cycles), and increases the plasticizing capacity of the machine from two to four times that when temperatures of 550 to 600°F. are used.¹

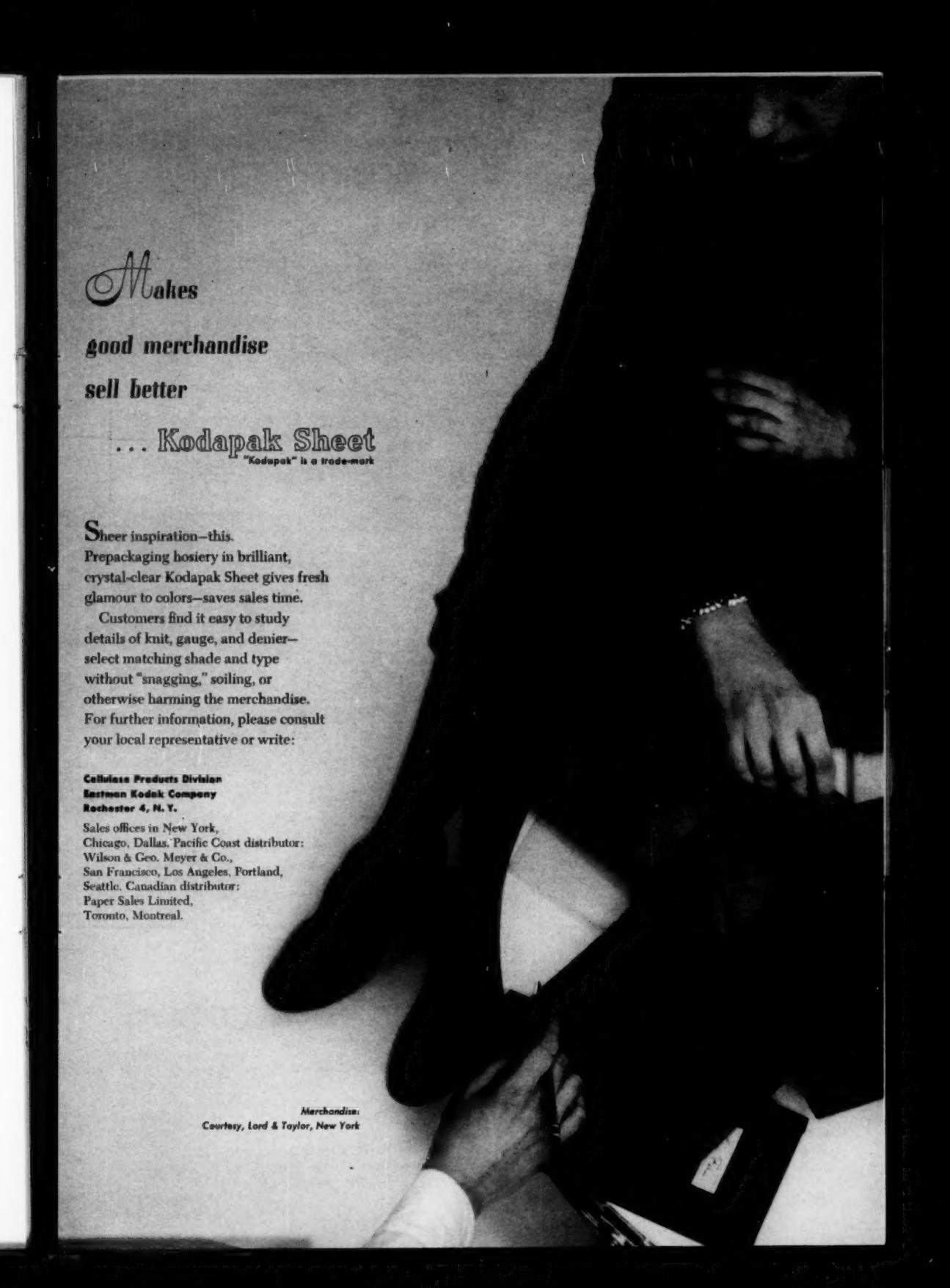
Moldings of thin section, produced in short cycles and at high rates of material consumption require higher cylinder temperatures than moldings of heavier section, longer cycles, and low rates of material consumption. For example, in the case of a 6-oz. shot being molded on an 11-oz. machine at a rate of about 11 lb. of nylon per hr., a temperature of 520 to 600°F. is indicated. If the same 8-oz. machine is used to mold a 2-oz. shot every 20 sec. (or about 22 lb. per hr.), a higher temperature will be required. An output of greater than 40 lb. per hr. on the same machine may necessitate cylinder temperatures as high as 720°F. At the higher molding temperatures, the mold for articles of thin section can be filled more easily at normal pressure.

The term *molding temperature* as used here refers to the maximum temperature within the cylinder. The area over which it is applied depends on the type of machine.

Types of Cylinders—The two major types of cylinders, as far as location of heating bands is concerned, are shown in Figs. 1 and 2. The type shown in Fig. 1 (typified by the De Mattia, HPM, Impco, Fellow-Leominster, Reed-Prentice, and Watson-Stillman machines) has no heating band over the course traveled by the plunger. The rear heating zone is at the rear section of the spreader. For this type of cylinder, the highest temperature should be maintained at the rear band (measured at the center of the heater band)—600°F. or hotter, depending on thickness of section, cycle, etc. A temperature about 50 to 150°F. lower is maintained over the front portion of the spreader section. The temperature at the extreme front end of the cylinder should be just high enough to keep the material moving through the nozzle—as low as 400°F. on fast cycles, or as high as 500°F. on slow shots.

In the cylinder design shown in Fig. 2 (exemplified by the Lester and Van Dorn machines), the rear

¹ More details on high-temperature molding of nylon are given in Information Bulletin No. 31, Polychemicals Dept., Du Pont Co., Wilmington, Del.



Makes

**good merchandise
sell better**

... Kodapak Sheet

"Kodapak" is a trade-mark

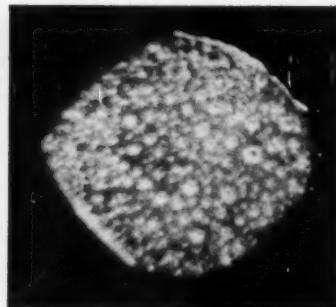
Sheer inspiration—this. Prepackaging hosiery in brilliant, crystal-clear Kodapak Sheet gives fresh glamour to colors—saves sales time.

Customers find it easy to study details of knit, gauge, and denier—select matching shade and type without "snagging," soiling, or otherwise harming the merchandise. For further information, please consult your local representative or write:

**Cellulose Products Division
Eastman Kodak Company
Rochester 4, N. Y.**

Sales offices in New York, Chicago, Dallas, Pacific Coast distributor: Wilson & Geo. Meyer & Co., San Francisco, Los Angeles, Portland, Seattle. Canadian distributor: Paper Sales Limited, Toronto, Montreal.

**Merchandise:
Courtesy, Lord & Taylor, New York**



Figs. 7A (left) and 7B—Molten dry nylon molding powder granules (enlarged) appear as in Fig. 7A. Bubbling or frothing on surface (Fig. 7B) indicates presence of moisture

heating zone overlaps a section of the plunger stroke. The rear band of such a cylinder should be heated only to about 450° F. The higher temperature is applied at the main body band. For the front portion of the spreader and the extreme front end of the cylinder, the same general rules apply as for the cylinder in Fig. 1.

Mold Temperatures—In general, the temperature of the mold should be about 100° F. Lower temperatures may be used when extreme toughness in thin sections is desired. Temperatures above 150° F. are seldom necessary, nor are they recommended. Such high mold temperatures will not help appreciably in filling thin-walled cavities, and may impair the toughness of the molded piece.

Molding Cycles—The length of cycle required can be estimated on the basis of one min. per $\frac{1}{4}$ -in. of thickness. Following this rule-of-thumb, a $\frac{1}{8}$ -in. section will require a cycle of about 30 sec.; a $\frac{1}{2}$ -in. section about 2 minutes. Articles with non-uniform cross-sections, in which edges or surfaces must be extremely straight or flat, will usually require much longer cycles.

Molding to Close Tolerances

The many variables existing in an injection molding operation will affect the over-all shrinkage of a molded item to some degree. Shrinkage may vary with size and type of the molding machine, size and shape of the molded article, flow pattern of the plastic in the mold, size of the sprue and nozzle, molding cycle, and temperature of

cylinder and mold. In addition to the amount of shrinkage after molding, the molding variables also affect the magnitude of stresses set up in the molded item. Stresses may relieve themselves in time, depending on the conditions to which the article is exposed, but the time required is unpredictable. The relief of such stresses will be accompanied by a dimensional change in the item. To insure against any dimensional change caused by stress-relief, it is important that residual stresses be relieved by heat-treating soon after molding.

The effects of molding variables on final dimensions of a molded piece both before and after heat treating are indicated in Tables I and II. Complete data are given in Table I; results are summarized in Table II to show the effects of each variable. Data are presented on a nylon bearing, produced in a mold having the following dimensions: cavity diameter, 1.250 in.; cavity depth, 1.0 in.; core diameter, 1.034 inches. These data should not be construed as specifically applicable to other sizes and shapes of articles molded of nylon; they are presented to illustrate the magnitude of effect on dimensions produced by a given variable, and should be used only as a guide when a slight adjustment of dimensions is required.

The data show that higher cylinder temperatures, higher injection pressures, longer cycles, and faster rates of injection tend to reduce the amount of shrinkage. Low mold temperatures also lessen shrinkage, but this difference in dimensions practically disappears after heat-

treating, indicating that it is caused initially by residual stresses.

Heat-Treating—It is recommended that heat-treating of nylon be carried out in the absence of air, preferably by immersion in a suitable liquid. The temperature of the heat-treating liquid should be well above the temperature to which the article of nylon will be exposed in use, preferably about 350° F. This will insure against dimensional change caused by uncontrolled stress-relief occurring below this temperature. Upon removal from the heat-treating bath, the molded article should be allowed to cool slowly in the absence of drafts; otherwise new surface stresses may result. A simple way of insuring slow, even cooling is to place the heated article in a cardboard container.

The choice of liquid to be used as the heat transfer medium should be based on the following considerations: 1) its heat range and stability should be adequate; 2) it should not attack nylon; 3) it should not give off noxious fumes or vapors; 4) it should not present a fire hazard; 5) it should be low in cost; 6) it should not require special or expensive equipment.

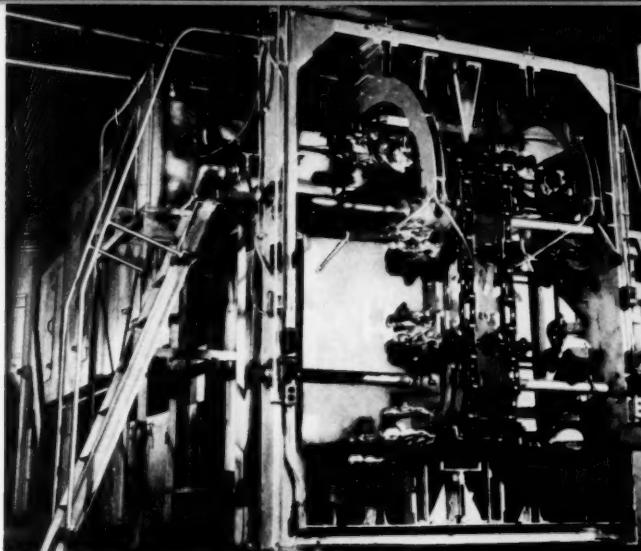
A heat-transfer medium such as Hitec³ heat transfer salt (Explosives Dept., E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.) meets these requirements and has been found very satisfactory. This salt melts at approximately 290° F. It can be heated in an iron or steel vessel but should not be heated in an aluminum vessel. The salt is water-soluble; therefore, if a slight residue is left on the nylon article it can readily be washed off with water after the article has cooled.

High-boiling hydrocarbons, such as oils or waxes, may be used as heat-transfer medium if the deposit left on the surface of the article is not objectionable. A film left by oils or waxes may be difficult and expensive to remove, but there may be instances where its presence is not harmful, as in the case of parts which will be lubricated in use.

The heat-treating bath should be electrically heated and thermostatically controlled to the desired temperature (350° F.). For good thermal control, heat should be supplied through the side-walls as well as

(Continued on p. 192)

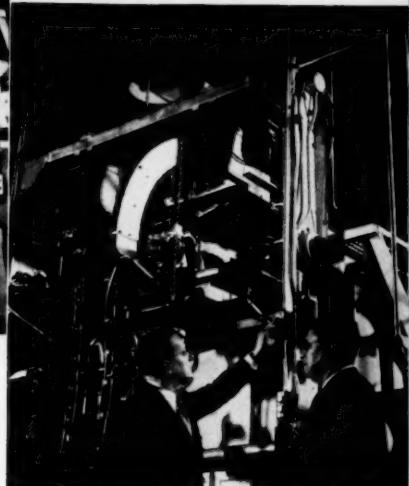
³ Reg. U. S. Pat. Office.



Automatic vinyl plastisol casting machine uses efficient rotational method

Machines maintain large-volume production—up to 150,000 pieces per day

Photos courtesy The Sun Rubber Co.



Rotational Casting of Plastisols

AN automatic vinyl plastisol casting machine has recently been developed by The Sun Rubber Co., Barberton, Ohio; three of them have already been placed in production.

Each machine includes two automatic mold conveyor systems; each conveyor is equipped with 48 mold mounting stations. Thus, each machine can handle 96 molds. In addition, up to 8 cavities have been used per mold, making a total productive capacity of as high as 768 cavities per machine.

The molds themselves, made of cast metal, are of the so-called split or two-part type, and are loaded with pre-determined charge of plastisol by automatic injection system.

After each mold is loaded, the mold is automatically closed and locked. It then begins to rotate in several planes in order to distribute the plastisol material uniformly. This rotation continues as the conveyor carries the molds through ovens where gelling and final fusing of the plastisol occurs. The conveyor then moves the molds through air-cooled chambers, where the mold

temperature is reduced. As the mold emerges from the cooling chambers, it ceases rotation and automatically unlocks and opens. The open mold containing the finished product is then in a fixed vertical position for easy unloading. The mold then progresses to the charging point, where a new cycle begins.

150,000 Pieces Per Day

Since actual out-put is governed by the number of cavities per mold and the speed of cycle, it is difficult to give an exact production figure for these machines. An indication, however, of the rate can be ascertained from the fact that with each station equipped with 8 cavities, over 150,000 pieces have been produced in a single day's run.

The use of the rotational method for casting plastisols eliminates the necessity of pouring out excess liquid resin, a step required in normal slush casting. Rotational casting also makes it possible to produce parts with no openings. In addition, the fact that the ingenious rotational mechanism turns the mold through



Mold opens in fixed vertical position for easy removal of finished product

several planes makes uniform wall thicknesses possible in the cast part.

These machines are equipped with simple mold mounting clamps with which it is possible to make a complete change of molds during one cycle without stopping the machine.



WHEN NEEDED . . . a specialist!

No machine has ever been invented to take over this job. 'Here, a man is needed—a specialist.

Many a fine product, too, misses success because *the man was missing—the specialist*. At Marblette you'll find one of America's most brilliant group of specialists in plastics. And around these men, in the last 22 years, Marblette has built up the special equipment specialists must have. In no other way would it have become possible to give you the special formulation in each liquid phenolic resin necessary to meet *your* special production requirements . . . and

to meet also the special functional needs of *your* product and to solve *your* special marketing problems.

Marblette's liquid phenolic resins are the thermo-setting plastics which can be set either by heat or at room temperature. Among other properties, they are weather-proof, solvent-proof, fungicidal; resistant to abrasion, heat and temperature.

Let Marblette's experience over the last quarter of a century help you in solving *your* liquid phenolic resin needs—whether it be in drums or tank car quantities. Our plant and offices are

strategically located to serve you promptly anywhere in the United States. Write "Marblette Engineering" to analyze and prepare samples for you of the one phenolic resin best suited to *your* special needs.

MARBLETTE

37-21 30th St. • Long Island City, New York • ST 4-8100

CHICAGO • LOS ANGELES • TORONTO • HAVANA

liquid phenolic resins

Casting resins for dies and tools • Heat and acid resistant resins • Bonding resins • Metal coating • Insulating varnish
Bristle setting cement • Laminating varnish • Wood coating • Plastic cements • Sealing resins • Resin foundry core binders

Role of Hydrogen Chloride in PVC Degradation

by ABB L. SCARBROUGH,[†] W. L. KELLNER,[†] and P. W. RIZZO[†]

POLYVINYL chloride degradation is basically a manufacturing problem. It was the manufacturing plant in which the problem was first recognized, and in which early remedies were prescribed. The change of color and physical properties of vinyl resins under exposure to heat and light was the first major stumbling block to their ascendancy as elastomeric and rigid plastic materials. Techniques have been developed to combat the problem, but in spite of the fact that polyvinyl chloride and its copolymers are the most used of contemporary plastic materials, their stabilization against heat and light breakdown is still the most pressing single problem connected with them.

Hydrogen chloride was the first product of polyvinyl chloride degradation to be recognized. It was known to be troublesome not only due to its own odor and corrosive action, but because, in some way, the degradation became worse as more free hydrogen chloride formed. The value of substances forming insoluble or relatively un-ionized chlorides was recognized; their ability to remove free hydrogen chloride led to improved thermal stability. These materials, basic lead carbonate and a few others, were the early stabilizers.

Advances to this point, as has been stressed above, were largely the result of empirical axioms derived from plant experience. The first attempts to study systematically what happens when vinyl resins degrade also marked the end of the idea that hydrogen chloride catalysis was the

sole significant factor in the process. In 1947, Boyer (1)[‡] reported the presence of carbonyl (C=O) groups in degraded polymer, indicating that oxygen was involved in the reaction.

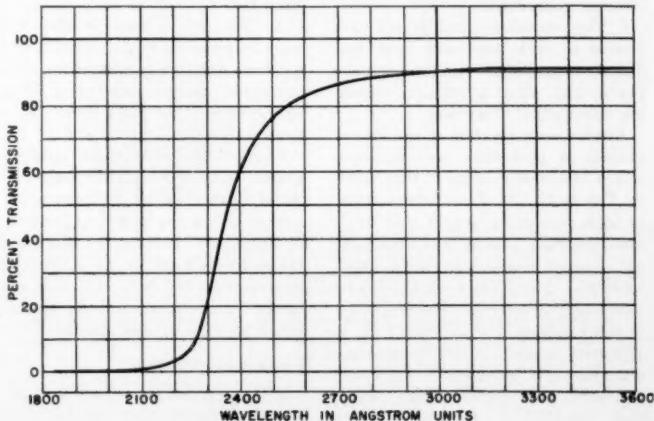
Fox, Hendricks, and Ratti (2) in 1949 established: 1) A relationship of the structures formed in degradation of polyvinyl chloride under heat conditions to structures found in the oxidized unsaturates in drying oils, as reported by Holman, Lundberg, and Burr (3, 4); these relationships were postulated as a result of similarities in absorption spectra in the range of 2500 to 3000 Å, and presumably may be attributed to polyene systems and carbonyl groups, alone or in conjugation; 2) The presence of structures with

many linearly conjugated double bonds in degraded polyvinyl chloride resins, through apparent relationships in the ultra-violet and visible light absorption spectrograms with those of carotene-type structures. These studies did much to establish the nature of the groups present in degraded resin, but did little to show by what mechanism degradation occurred, or in what way the reagents involved participate.

Kenyon (5) studied irradiation effects of ultra-violet light (3130 Å) on sec-butyl chloride and on cast films of polyvinyl chloride, and showed the catalytic effects of reagents containing carbonyl groups on the decomposition of sec-butyl chloride. A mechanism was postulated involving free radical formation, an explanation which might account for car-

[‡] Numbers in parentheses link to references p. 122.

Fig. 1—Ultra-violet transmission for Vycor glass No. 791



* Reg. U. S. Pat. Office.

[†] National Lead Co. Research Laboratories.

bonyl group formation in systems of this type. Credence was given to the procedure by previous work on polyvinylidene chloride by Matheson and Boyer (6), showing that during sun-light exposure, virtually all of the degradation was accomplished by ultra-violet radiation of wavelength longer than 3000 Å.

The purposes of the present study were: 1) To fix the role of hydrogen chloride in the polyvinyl chloride degradation process; 2) To clarify the relationship of oxygen to the course of the degradation; 3) To account for observed differences between the effects of heat and of light on the course of degradation through the above two hypotheses; 4) To suggest approaches to combating degradation in view of any new concepts on the role of the participants in the reaction.

Experimental Method

Choice of a procedure for determining the effects of oxygen and hydrogen chloride on the course of polyvinyl chloride degradation is governed by 3 main considerations:

1. The procedure must permit a sufficient surface of the experimental samples to be exposed to insure that definite trends are produced by the variation in atmospheres.

2. The procedure must permit quantitative observation of the course of the degradation under various conditions, without the necessity for further treatment of the test samples in order to convert them into a suitable form for evaluation. Further exposure beyond that used in the actual tests might intensify or change the course of the induced degradation.

3. The procedure must permit exposure to both heat and light induced degradation under atmospheric and other conditions which are substantially identical.

After a consideration of the alternatives, a procedure was adopted which is a modification of that used by Fox et al. (2). Transparent disks of high molecular weight polyvinyl chloride resin (Geon 101), 0.033-in. thick, were molded at 110°C. and 7,000 p.s.i. in a 20-min. cycle. Ultra-violet light absorption spectrograms in the range of 2000 to 4000 Å were prepared on each of the transparent disks, using a Beckman DU Spectrophotometer. Selected disks were then exposed to heat and light in

each of the following atmospheres: 1) dry air; 2) nitrogen; 3) dry air-hydrogen chloride (95%-5%); 4) nitrogen-hydrogen chloride (95%-5%).

Heat Tests—A specially constructed glass cell permitting constant circulation of the individual atmospheres was used. Circulation rates were such as to permit maintenance of an 85°C. temperature. The cells containing the vinyl disks were sealed with Pyrex plates, allowing removal of the samples after each two hr. of exposure for the purpose of preparing spectrograms of the ultra-violet light absorption. In this way, the course of the degradation was followed constantly during the exposure period. Original and final spectrograms were also taken in a Baird Infrared Spectrophotometer, Model B, to determine any absorption changes in this region of the spectrum.

Light Tests—A Westinghouse RS sunlamp was used. This source has strong radiation bands in the vicinity of 3024 Å, 3650 Å, and 4047 Å, and according to the work of Matheson and Boyer (6) should be well suited to inducing vinyl degradation. Moreover, the practical value of such a light source is shown by the work of Kohler (7) and others (8, 9), who have found that radiations less than 3000 Å in length amount to less than 5% of solar incident light on the earth's surface. To take advantage of this energy source, the Pyrex window used to seal the samples into the cell during the heat exposure tests was replaced by a plate of Vycor glass No. 791, which admits the effective radiation of the RS sunlamp into the cell as seen in Fig. 1 (10). The atmospheres in the cells were renewed at 2-hr. intervals, and good air circulation around the cells permitted maintenance of a 30°C. temperature. The disks were 18 in. from the light source.

Ultra-violet absorption spectrograms were taken after approximately every 25 hr. of light exposure to follow the course of the degradation. In addition to the four atmospheres used in the studies on heat degradation, light action on one sample was observed in an atmosphere of pure oxygen.

Limitations of Method

Although this procedure was believed to be the best available for

the purpose, certain limitations are inherent. First, the transparent molded disks are somewhat thicker than is desirable from two standpoints: 1) Greater exposure to the various atmospheres per unit weight is possible when thinner disks are used; 2) Greater sensitivity in the various spectrographic recording machines is possible through use of thinner sections.

Actually the lower limit on the thickness of the disk is established by the speed at which the mold used in its preparation may be heated and cooled. The required temperature for fusion of the disk can be attained only by such amounts of applied heat as would degrade smaller amounts of resin to the point where further exposure studies would be impossible.

It would also be desirable to expose the samples to heat at temperatures more closely approximating those used in plant processing of vinyl resins. However, attempts to conduct heat tests at the 150°C. level caused warping of the plastic disks, making absorption spectra determinations impossible. Repeated experiments showed 85°C. to be the highest practical exposure temperature for this procedure.

A practical limitation of the selected test method is the elimination of plasticizers as a factor in the studies. Admittedly, most vinyl plastic articles contain plasticizers, and these plasticizers have a profound effect on the stability characteristics of the compound as a whole.

Plasticizers, however, are a complicating factor which direct attention away from the basic problem, the degradation behavior of the resin itself. They also obscure by their own effects the absorption spectra of the degraded resin, and so make attempts to determine anything by this method hopelessly complicated. The individual effects of plasticizers and other compounding materials on vinyl degradation are better accounted for at the practical level for particular cases.

Results and Discussions

Figure 2 shows the results obtained by exposing a molded disk to air at 85°C. for 10 hours. The ultra-violet absorption curve taken on the original disk (0 hr.) shows no peak at all. This was found to be a reliable index of the quality of the original disk, and considerable effort

Put **MOSINEE** Forest Fibres

to work . . . in your plastics



Remember . . . MOSINEE means more than "paper" to plastics experts. MOSINEE stands for FIBRES that have scientifically controlled chemical and physical properties to perform specific jobs . . . fibres of dependable uniformity on which you can rely in your plastics processing operations.

MOSINEE has its sources of quality forest fibres, practical experience, laboratory facilities and scientific production controls to create and produce the type of fibres your plastics operations needs . . .

- Fibres absorbent or non-absorbent . . .
- Fibres tough, flexible or stiff, dense or porous, mold-resistant . . .
- Fibres for impregnation with resin or other plastics . . .
- Acidity or alkalinity-controlled fibres . . . or fibres made as you need them, controlled to your specifications. Contact . . .

MOSINEE PAPER MILLS COMPANY • Mosinee, Wisconsin



MOSINEE makes fibres work for industry

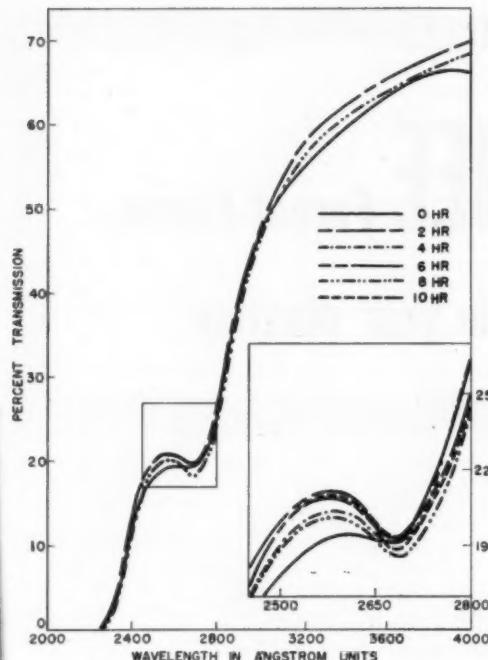


Fig. 2—Polyvinyl chloride degraded by heat under air

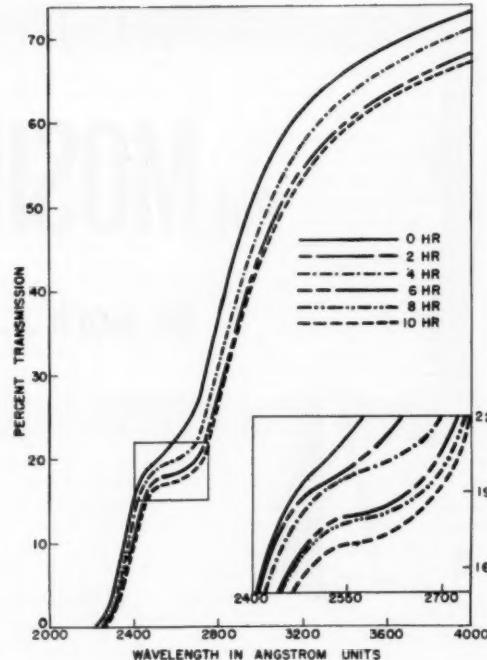


Fig. 3—Polyvinyl chloride degraded by heat under nitrogen

was necessary to develop a molding technique which affords satisfactory disks in a reproducible fashion. The successively greater breaks in the curves as the exposure to heat was continued are a definite measure of increased degradation. The inset showing the critical region on a larger scale shows a fairly close grouping of the curves, with small differences in the amount of break. The extent of the break in each curve, obtained by subtracting the minimum values in the 2700 Å region from the maximum values in the 2550 to 2600 Å region, will be discussed later in comparing the effects of different atmospheres.

Figure 3 illustrates the effects of the same heat cycle in nitrogen. It is immediately apparent that there is no peak in the curves as was seen in Fig. 2. The inert atmosphere prevents degradation to the extent that even after 10 hr. of heating, there is no appreciable break in the curve, though some displacement towards longer wavelengths is evident.

In Fig. 4, the addition of gaseous hydrogen chloride to the air system is seen to have caused a progres-

sively greater break in the curves during heating. The curves are more clearly separated by a marked displacement towards longer wavelengths. Degradation is more severe than in air alone as shown by the greater differences between maxima and minima.

An even more striking effect is obtained when hydrogen chloride is added to the nitrogen system, as shown in Fig. 5. Whereas there was some degradation in air which hydrogen chloride accelerated, the nitrogen system was changed from no apparent degradation to one in which the depth of the curve breaks and the displacement towards longer wavelengths are at least equal to those of the air-hydrogen chloride system.

Figure 6 shows the result of light exposure in air. In the experimental conditions used, the degrading influence of light gave stronger breaks than those obtained in the heat tests. There is a fairly strong pattern of breakdown in this system.

In Fig. 7, the effect of light exposure in a nitrogen atmosphere is shown. The breaks in the curves are

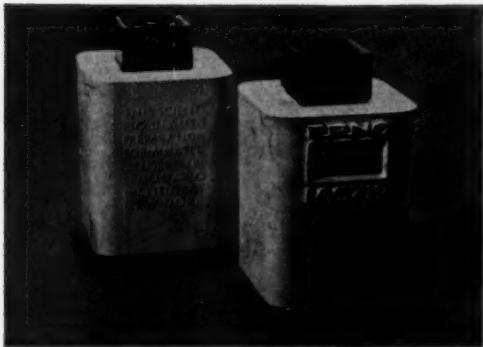
comparable to those obtained in air, though there is somewhat less displacement of the curves towards the right. The major point of interest is the change in behavior from the heat study, where there was no apparent degradation in nitrogen.

Addition of hydrogen chloride to the air system under light resulted in uniformly deeper breaks in the curves, as shown in Fig. 8. There is a smaller spread in the upper right-hand portions, and generally less shifting towards longer wavelengths.

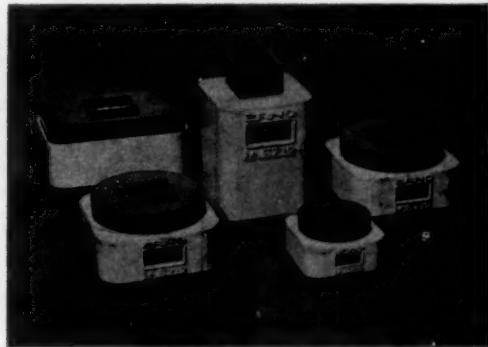
Figure 9 shows the absorption curves after light exposure in a nitrogen-hydrogen chloride system. A pronounced increase in the amount of degradation is evident at each time interval. This parallels the results in heat studies, where hydrogen chloride promoted greater breakdown in the inert atmospheres.

Figure 10 illustrates what happened when a disk was exposed to light in pure oxygen. The degradation pattern is generally similar to the one obtained in air, except that there is less displacement of the curves towards the right, and the breaks in the curves are consider-

here's Sheer Elegance
in cosmetic containers "topped" by
exquisite relief-molded cameo closures



The 8 oz. bottle utilizes two BEETLE closures. The decorative, square closure is molded with inner ribs so that it may be snapped into place over a functional, round, threaded closure.



BEETLE closures for The Erno Lazlo Company were designed by Carl Otto and molded of BEETLE urea plastic by Plastics Division of Colt's Manufacturing Company.

made of **BEETLE**[®] plastic

Leave it to versatile BEETLE urea plastic to meet a challenge such as this: to express, in a closure, the character and prestige of one of the most exclusive cosmetic lines in the retail field. Obviously it would have to be distinctive and elegant.

And BEETLE did it! With its beauty, color permanence, dimensional stability and excellent workability, BEETLE gave top performance in the mold, fashioning a closure of eye-stopping magnificence, with strong selling power for the highest-priced field.

BEETLE does lesser jobs, of course, and big or little, it does its job well, lending color, character and richness to all types of container tops. BEETLE does not stain from alcohol, mild chemicals, essential oils or perspiration. And it won't attract dust on counters!

So, for "top" performance, investigate BEETLE plastic.



In Canada: North American Cyanamid Limited,
Royal Bank Building, Toronto, Ontario, Canada.

ably deeper. The differences appear to reflect a similar type of breakdown with the higher proportion of oxygen being the only important variable.

Infra-red and visible absorption spectra were made on the above disks and studied carefully. The absence of significant break differentials made it impossible to draw any conclusions whatsoever regarding the above experimental work. Either the extent of degradation was insufficient to produce significant changes or the thickness of the disks precluded adequately sensitive measurements.

Interpretation of Results

A substantial amount of data has been reported on ultra-violet light absorption of alkyl halides, ketones, and unsaturated compounds. We are not so fortunate when it comes to a study of polyvinyl chloride degradation, as very few data are available. We know that changes in the polymer molecules are taking place from the ultra-violet absorption curves reported above, and interpretation

of these changes is best done in a rather fundamental fashion.

The characteristic absorption of light in the visible and ultra-violet portions of the spectrum is due to the vibration of electrons. A substance that absorbs only in the ultra-violet is colorless, and the electrons exist at a relatively low degree of mobility. If the structure of such molecules is altered so as to increase the electron mobility successively, the frequencies of light absorbed progressively decrease. Thus, ultimately the absorption bands enter the visible range of the spectrum. The first visible light to be absorbed will be in the violet, and therefore, to the eye, the substance in question will appear yellow.

The yellow to brown color developed by polyvinyl chloride upon exposure to light is due to this type of shift. Just as the characteristic absorption occurs at increasingly lower frequencies (longer wavelengths) as we progress from alkyl halides to unsaturated alkyl halides to conjugated olefinic structures, so does the absorption pattern of poly-

vinyl chloride correlate reasonably well with the accepted theory of degradation through the process of dehydrochlorination. The loss of hydrogen chloride can be initiated by thermal energy and by energy resulting from the absorption of light. These two degradation influences operate along somewhat different paths, and a major purpose of the present work is to account for the role of hydrogen chloride in these two processes.

Figure 11 shows one means of analyzing the effect of hydrogen chloride on the degradation mechanism while operating under the influence of heat in two types of atmospheres. The data for the curves in this figure were obtained from the earlier figures showing the degradation effects in nitrogen, in air, and in mixtures of these gases with 5% hydrogen chloride.

The maxima-minima differences (the height of the humps in the curves) were determined for each curve. Then, for each exposure interval, this value in the non-hydrogen chloride containing system was

Fig. 4—Polyvinyl chloride degraded by heat under 95% air-5% HCl

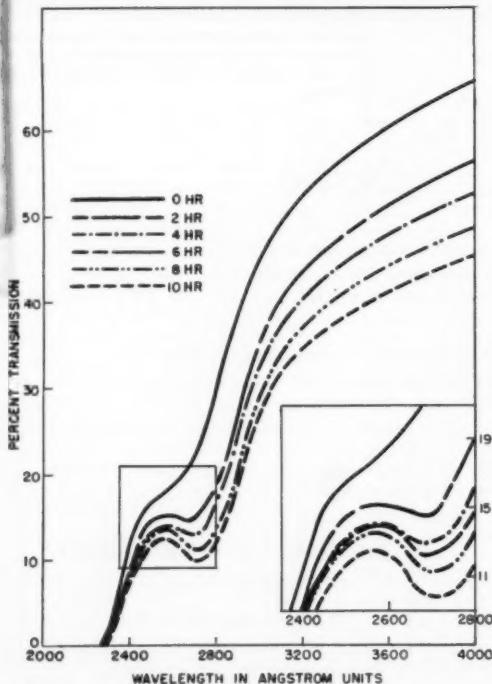
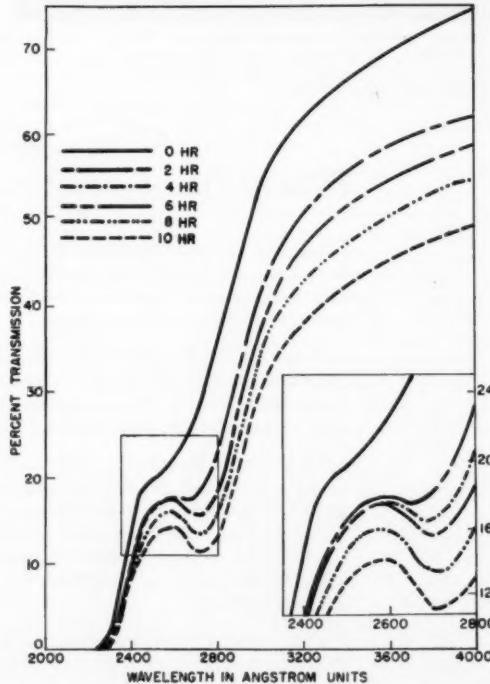


Fig. 5—Polyvinyl chloride degraded by heat under 95% N₂-5% HCl



*



*

Z

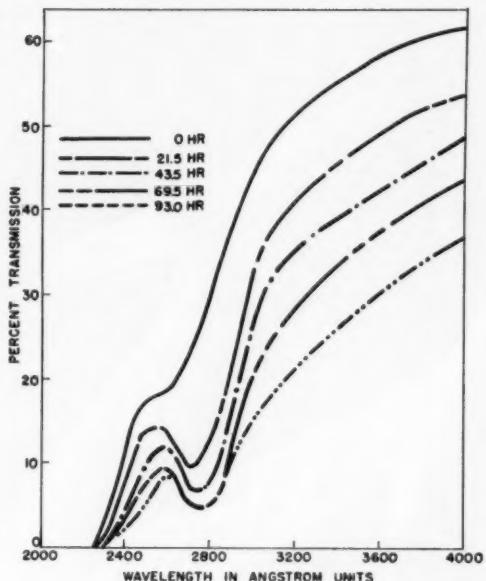
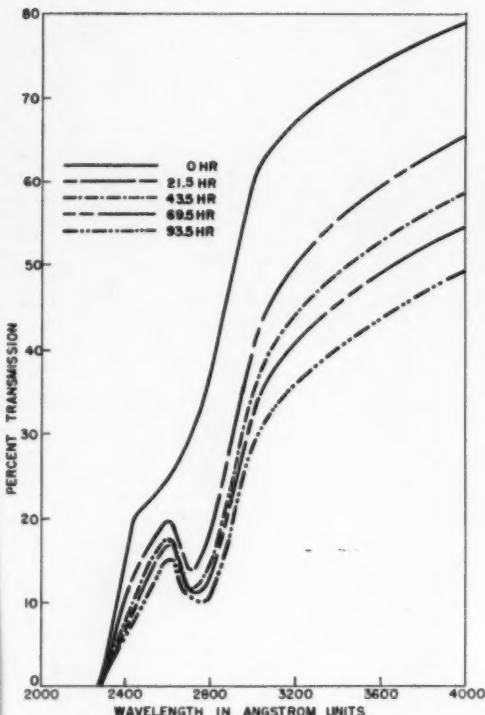


Fig. 6 (above)—Polyvinyl chloride degraded by light under air

Fig. 7 (left)—Polyvinyl chloride degraded by light under nitrogen

subtracted from the value in the same system containing hydrogen chloride. These values were plotted against time of exposure. It will be noted that these curves are formed by connecting the points directly without attempting to draw a smooth curve.

The similarity between the nitrogen systems and the air systems, as indicated by the two curves, is rather striking. Through the first 8 hr. of heating, there is obviously a parallel course of reaction in the two systems. This represents only one basic degradation mechanism, since the effect of hydrogen chloride in both atmospheres as represented by these curves is parallel and almost linear. The almost identical rates of reaction shown by these curves leads us to the conclusion that molecular oxygen is taking no apparent part in the degradation mechanism up to a point. The divergence of the air curve after 8 hr. of heating indicates that oxidation is beginning to participate in the breakdown of the polymer. Presumably, a certain amount of dehydrochlorination must

occur before oxidative attack begins to take place. This practically amounts to an induction period under heat before oxidative degradation starts. These curves also afford an excellent indication that hydrogen chloride plays no important part in catalyzing oxidative attack in the absence of light. On the other hand, hydrogen chloride is a uniform catalyst for the dehydrochlorination reaction, at least it is up to the point where we lose track of it in the air system because of the advent of the oxidative process.

Figure 12 shows a similar plot of weighted curves illustrating the effect of hydrogen chloride in the two systems under light exposure. Here there are quite different results both in the nitrogen and in the air systems.

In nitrogen, hydrogen chloride has little effect on degradation characteristics during a short induction period. It then begins to act as a reasonably uniform catalyst. We conclude that under both ultra-violet light and heat, the presence

of oxygen is not necessary to the dehydrochlorination process, and in fact has no effect until advanced stages are reached.

The air curve under ultra-violet light is significantly different from the one for the nitrogen systems. While there is a parallel behavior suggesting only dehydrochlorination as the major factor in the nitrogen systems under heat, there is clearly an entirely different type of degradation mechanism at work in air under ultra-violet light.

The "induction period" of about 8 hr. observed in the heat treatment of the air system is lacking under ultra-violet light. The latter curve shows the immediate onset of the oxidative mechanism through catalysis by the ultra-violet light. There is ample support for the catalytic effect of ultra-violet light in the oxidation of alkyl halides (11) and polyene systems (3, 12).

The oxidative attack on the vinyl polymer under light is not catalyzed by hydrogen chloride, as is shown by the level curve with no increase in the rate of reaction after it has

smooth *shaver*

Lustrous gray Tenite is molded to form a compact, lightweight housing for the Sunbeam Shavemaster. Designed for speed and comfort as well as for keen cutting,

this electric shaver fits easily in the hand and has an inherent pleasant feel to fingers and face. In addition to handsome appearance, the noncorrodible Tenite case lends high impact strength and a permanent chippresistant surface which is simple to keep clean.

Exceptional durability and unlimited color choice make Tenite a popular housing, also, for such other products as scales, thermometers, tools, and numerous household appliances. The tough material adapts readily to either molding or extruding, has a lasting lustrous finish.

For further information about the properties and many uses of Tenite, write Tennessee Eastman Company, Division of

Eastman Kodak Company, Kingsport, Tennessee.

TENITE

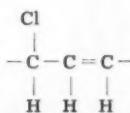
an Eastman plastic

● Information regarding Tenite is also obtainable through representatives located in Chicago, Cleveland, Dayton, Detroit, Leominster (Mass.), Los Angeles, New York, Portland (Ore.), Rochester (N. Y.), St. Louis, San Francisco, and Seattle; and elsewhere throughout the world from Eastman Kodak Company affiliates and distributors.

• Sunbeam Shavemaster manufactured by Sunbeam Corporation, Chicago. Housing molded by Chicago Molded Products Corporation.

started. The initial oxidative attack does depend on preliminary dehydrochlorination to provide points on the chain which are more susceptible to oxidation. Thus, we may conclude that hydrogen chloride, which is a catalyst for the dehydrochlorination step, speeds up the initial attack of oxygen in the presence of ultra-violet light even though hydrogen chloride is not an oxidation catalyst in this reaction. At the same time, the dehydrochlorination reaction does not continue at the rates observed in an inert atmosphere. This is due to the effective blocking of conjugation in a chain through disruption of double bonds by formation of carbonyl groups or by actual scission.

A more detailed consideration of this action of oxygen in decreasing the rate of dehydrochlorination will also help to explain certain other experimental effects which were noted. The initial random split-out of hydrogen chloride from the polymer chain leaves a structure of the type



present in the molecule. The chlorine atom remaining on the chain is exceptionally labile to further split-out as hydrogen chloride because of its activation by the adjacent double bond. The high reactivity of the "allyl" structure is well known. As pointed out by previous investigators (1, 2), progressive occurrence of this type of reaction accounts in large part for the color-bearing conjugated polyene systems present in degraded vinyl resin.

Oxygen counteracts operation of this mechanism in three ways: 1) Oxidation catalyzed by ultra-violet light reduces the number of labile chlorine atoms in the polymer due to reaction with the double bonds which create these "allylic excitation" centers. 2) Oxygen decreases the tendency of the polymer to absorb incident ultra-violet light

energy. The points of greatest conjugated unsaturation are the most effective ultra-violet light absorbers, and oxygen, by reacting preferentially at these points, will break up conjugated unsaturation. 3) Oxygen under the action of ultra-violet light exerts a bleaching action on the degraded polymer. This is accomplished by reaction with the carotene-like structures consisting of many conjugated double bonds, known to be color-bearing structures. Operation of these three factors was indicated experimentally by the fact that the disks which were exposed in nitrogen atmospheres showed spot degradation and a greater visible color formation.

It has been observed that polyvinyl chloride which has been previously exposed to light is far less stable to heat than the unexposed material. This can be accounted for by the much shorter induction period for oxidative attack observed under ultra-violet light than is noted under heat treatment. The absorption of

Fig. 8—Polyvinyl chloride degraded by light under 95% air-5% HCl

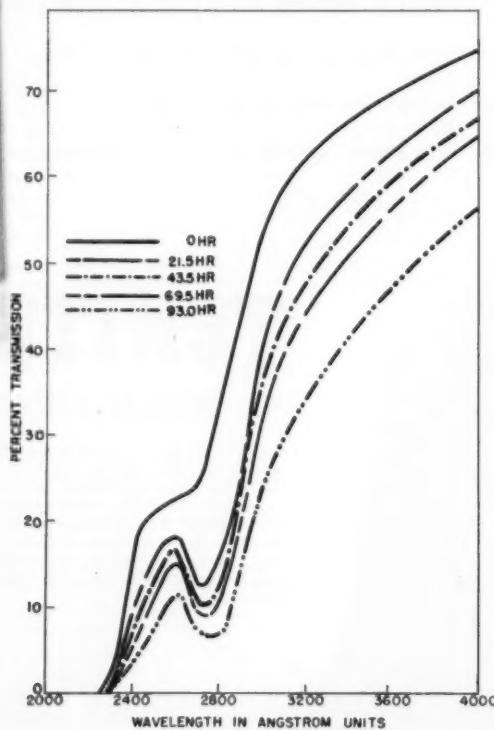
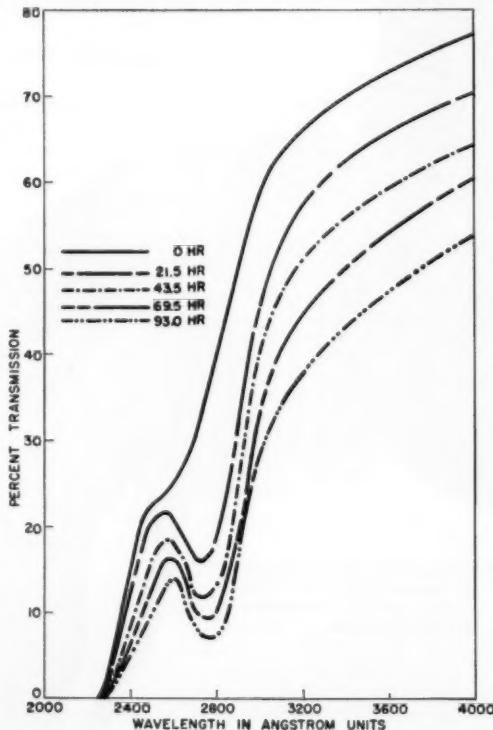


Fig. 9—Polyvinyl chloride degraded by light under 95% N₂-5% HCl





to improve process efficiency? **CYANAMID STEARATES**

For paints, enamels and printing inks, dependable Cyanamid Stearates improve suspension, with definite grades available to give *controlled* increase in viscosity to the carrying vehicle.

Their versatility doesn't end there. Cyanamid Stearates act as excellent internal and mold lubricants for plastics and rubber . . . produce greases with superior lubrication properties . . . improve spreading characteristics of cosmetics.

For added convenience and protection, quality-controlled Cyanamid Stearates are available in multi-wall bags.

Write today for booklet describing Cyanamid Stearates.

A Complete Line of Cyanamid Stearates: Calcium • Aluminum • Zinc • Magnesium . . . for paints, lubricants, plastics, inks, rubber, cosmetics and other uses.

AMERICAN *Cyanamid* COMPANY

INDUSTRIAL CHEMICALS DIVISION, DEPT. MPS
30 ROCKEFELLER PLAZA, NEW YORK 20, N.Y.

In Canada: North American Cyanamid Limited, Toronto and Montreal

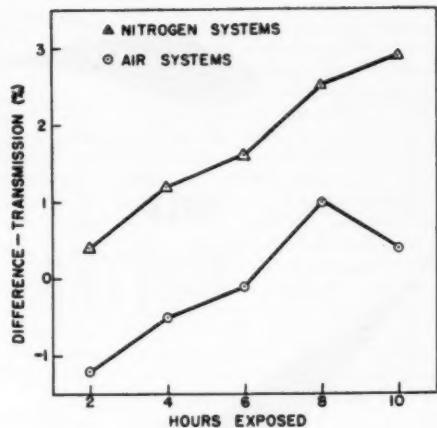
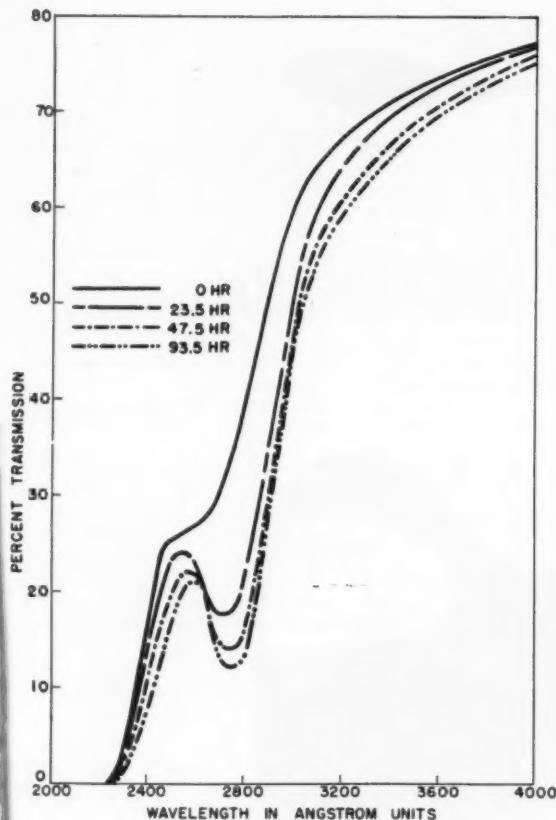
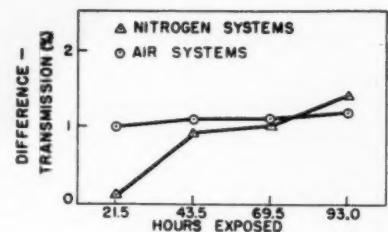


Fig. 10 (left)—PVC degraded by light under oxygen. Fig. 11 (above)—Effect of HCl in heat degradation of PVC. Fig. 12 (below)—Effect of HCl in light degradation of PVC



ultra-violet light catalyzes the initial take-up of oxygen. The induction period is thus disposed of rapidly and the oxidative process proceeds readily under heat.

An effective antioxidant might be expected to prolong the induction period of the oxidative process because it does not permit the oxygen to obtain a foothold in the polymer chain. It must, however, also be an acid acceptor, or be used in conjunction with one, otherwise the degradation will proceed rapidly through the catalyzed dehydrochlorination mechanism. The transfer of the degradation mechanism from one process to the other can be visualized by consulting the curves in Fig. 12.

Conclusions

1. Under heat exposure, oxidation is not a factor until a certain minimum level of dehydrochlorination has been reached.

2. Hydrogen chloride does not catalyze oxidation in the absence of light.

3. Hydrogen chloride is a uniform catalyst for the dehydrochlorination process.

4. Ultra-violet light catalyzes oxidation after a very short induction period.

5. There are three distinct effects of oxidation. It disrupts the following: 1) dehydrochlorination; 2) ultra-violet light absorption; and 3) color formation.

6. An antioxidant, to be a good light stabilizer for polyvinyl chloride, must be to some extent an acid acceptor, or be used with an acid acceptor.

7. The thermal instability of irradiated polyvinyl chloride is attributed to the premature completion of the induction period preceding oxidative attack.

The authors wish to express their

appreciation to Mr. Walter C. Weithas and to the other members of the National Lead Co. Research Laboratories' staff for their assistance in experimental work and in the preparation of the accompanying illustrations.

References

- Boyer, R. F., *J. Phys. & Colloid Chem.* 51, 1947.
- Fox, W. W., Hendricks, J. G., and Ratti, H. J., *Ind. & Eng. Chem.* 41, 1774 (1949).
- Holman, R. T., Lundberg, W. O., and Burr, G. O., *J. Am. Chem. Soc.* 67, 1386 (1945).
- Holman, R. T., Lundberg, W. O., and Burr, G. O., *J. Am. Chem. Soc.* 67, 1390 (1945).
- Kenyon, A. S., *The Photodegradation of sec-Butyl Chloride and Polyvinyl Chloride*, presented at 119th Meeting of American Chemical Society at Boston, Mass., Apr. 3, 1951.
- Matheson, L. A., and Boyer, R. F., *Light Stability of Polymers and Polyvinylidene Chloride*, presented at 118th Meeting of American Chemical Society at Chicago, Ill., Sept. 1950.
- Coblentz, W. W., and Kohler, H., *Sci. Papers Bur. Standards* 378 (1920).
- Forsythe, W. E., and Christison, F., *Gen. Elec. Rev.* 32, 664 (1929).
- Forsythe, W. E., and Christison, F., *Gen. Elec. Rev.* 32, 667 (1929).
- Nordberg, M. E., *J. Am. Ceramic Soc.* 27, (10) 299 (1944).
- Stobbe, H., and Schmitt, P., *Z. Wiss. Phot.* 20, 51 (1920).
- Farmer, E. H., Bloomfield, G. F., Sudrahlen, A., and Sutton, D. A., *Rubber Chem. Tech.* 15, 756 (1942).

In Barrett® Plasticizers . . .

Uniformity

1. Because of Barrett's basic position in raw materials
2. Because of Barrett's basic research experience

Uniformity of formulation at a high level of quality—to the optimum degree—is essential to your business.

When you buy from Barrett, you are assured of uniformity that is backed by a basic position in raw materials plus nearly 100 years of concentrated experience in coal-tar chemistry.

THE BARRETT DIVISION
VALUO CHEMICAL & DYE CORPORATION
10 ECTOR STREET, NEW YORK 4, N. Y.

Barrett is Back



**ELASTEX® 10-P Plasticizer—“D.I.O.P.”
“ELASTEX® 20-P Plasticizer—“D.O.P.”
“ELASTEX® BCNP Plasticizer
“ELASTEX® 50-D® Plasticizer
DIBUTYL PHTHALATE**

Exotherm Curves for Cold-Setting Polyester Resins

by F. S. NICHOLS[†] and C. H. BLISS[†]

THE advantages of the so-called cold-setting technique for curing polyester resins are now so well known that the process has gained wide acceptance. The chemistry of thermosetting resins is so complex that their use tends to become more of an art than a science. When a scientific tool or approach is available, therefore, it behooves us to take full advantage of it. Such a tool is the use of exotherm curves. There have been in the past several references to the usefulness of exotherm curves in the following of the heat-curing of polyester resins. They are even more useful to the cold-setting technique.

The names that have been given to this process, such as cold-setting, room temperature curing, etc., are rather inapt since in most cases the self-generated heat raises the resin temperature far above room temperature and the exothermic heat is usually a major factor in attaining cure. There are, however, cases in which an adequate, if not quantitatively complete, cure can be obtained under circumstances which do not permit an appreciable rise in temperature.

While the mechanism of cold setting has not been completely proved, the following explanation appears to be most adequate. Like other addition polymerizations, the curing of polyester resins is a chain reaction proceeding through free radicals. In a heat cure the action of heat on the catalyst produces free radicals which activate molecules of the monomer. The production of free radicals by the catalyst at room temperature is normally so slow that it is practically negligible. By the addition of a suitable substance known as an accelerator or promoter which reacts with the catalyst at room temperature to

produce free radicals, it is possible to initiate the reaction without the application of heat. It is apparent, therefore, that the accelerator must be matched to the particular catalyst. An accelerator such as cobalt naphthenate, for example, which works very well with methyl ethyl ketone peroxide catalyst may be quite unsatisfactory with benzoyl peroxide. It is less obvious, but none-the-less true, that the catalyst-accelerator system must be matched to the resin. The explanation of this apparently lies in the inhibitor, a very important but little publicized component of the resin, as supplied by the manufacturer. The inhibitor is added in very minute amount to control the shelf life and has a considerable effect on the course of polymerization. It would, therefore, appear that we must match the catalyst-accelerator system, not so much with the resin, but with the inhibitor in the resin. This apparently explains the fact that a catalyst-accelerator system which works with one resin will usually work with the other members of the resin family made by that manufacturer, but may refuse to work with essentially similar resins made by other manufacturers.

The quantity of exothermic heat liberated by a given weight of a particular resin is fixed; it depends only on the chemical composition of the resin. However, the rate at which this heat is liberated and, therefore, the rate of rise in temperature and the maximum temperature attained is controllable. It is a function of such things as shape, composition of the mold material, ambient temperature, and, most important for our present purpose, composition and concentration of catalyst and accelerator. As will be seen from the results quoted later, its dependence on catalyst and accelerator concentra-

tions is not simple, hence the need for exotherm curves.

The measuring of gel time and the exotherms has been described (1)¹, but relates to heat cures and requires modification for our purpose. The technique is not critical and requires only the standardization of certain factors. A quantity of resin, catalyst, and accelerator are placed in a suitable container and the temperature in the center of the resin noted at intervals until after the peak of the exotherm. No heating bath, of course, is necessary nor are any heat insulation precautions. It is simply necessary to maintain room temperature reasonably constant, avoid drafts, and standardize on the quantity of resin and on the container. Since it is usually impossible to clean the cured resin from the container, it is convenient to use a cheap 4-oz. glass jar or a disposable paper cup. The quantity of resin should be such that the minimum quantities of catalyst and accelerator to be used give a reasonably measurable temperature rise while the maximum quantities do not give a reaction sufficiently vigorous as to cause decomposition; 50 or 100 g. of resin are normally suitable. Where the resin is to be used with fillers, it will normally be convenient to test the filled resin, though, as no attempt will be made to draw quantitative conclusions from the actual temperature reached, this is not essential. It is important that the resin should be at room temperature at the start of the test.

A thermocouple provides the most convenient means of measuring the temperature, provided an instrument is available which can be read with an accuracy of 1 to 2 degrees over the range from room temperature to

(Continued on p. 194)

[†] Reg. U. S. Pat. Office
[†] Transformer & Allied Products Dept. Laboratory,
General Electric Co.

¹ Numbers in parentheses refer to the references listed on p. 204.

R. L. Smith, Chief Engineer, and W. E. Foster, Assistant Sales Manager, of General Industries examine one of their products . . . a record player cabinet, perfectly molded from preforms uniformly heated and cured with THERMEX Electronic Heating Equipment.



"One of our best investments!"

...says
**The General Industries
Company**

A TOTAL of 60 THERMEX® Plastic Preheating Units of 184 kilowatts capacity are on the job at The General Industries Company, Elyria, Ohio. Many of these units have been in constant service for as long as six years. According to this world's largest independent manufacturer of plastics products, this plant-wide installation has proved highly dependable and profitable . . . giving *faster production, more uniform cures and lower costs.*

Find out how you can benefit from THERMEX Preheating Apparatus. A THERMEX Engineer will gladly analyze your problems. Call today or write The Girdler Corporation, Thermex Division, Louisville 1, Kentucky.

THERMEX — T. M. Reg. U. S. Pat. Off.



Operator closes sliding drawer of 7½-kilowatt THERMEX Plastic Preheating Unit, and high-frequency power comes on automatically. After pre-set interval, power is shut off by timer. Foolproof operation improves quality control.

The **GIRDLER** Corporation
THERMEX DIVISION

PLASTICS DIGEST*

Abstracts from the world's literature of interest to those who make or use plastics or plastics products. Send requests for periodicals to the publishers listed.

General

PLASTICS. E. E. McSweeney. Chem. Eng. News 30, 24-5 (Jan. 7, 1952). Over-all developments in the plastics industry during 1951 are reviewed.

GROWTH OF VINYL CHLORIDE. D. S. Plumb and R. F. Hansen. Chem. Eng. News 29, 5432-4 (Dec. 24, 1951). The growth in volume and applications of polyvinyl chloride resins during the last 6 years are reviewed. The growth in volume for sheet and film has been 453%, for moldings and extrusions 192%, and for textiles and paper coatings 392 percent. This represents a total increase in volume of 281 percent.

Materials

THERMOPLASTIC HONEYCOMBS. G. May. Plastics (London) 16, 305-7 (Nov. 1951). Honeycomb structures made from cellulose acetate plastic film, 0.0025 to 0.010 in. thick, are described. Applications are reported.

SOME CHEMICAL ASPECTS OF PHENOL-FORMALDEHYDE RESINS. P. H. Calderbank. Brit. Plastics 24, 356-8 (Oct. 1951). Properties related to the chemical structure and synthesis of phenol-formaldehyde resins are reviewed.

COPOLYMERIZATION OF 2-CHLOROALLYL LINOLEATE WITH STYRENE. E. Dyer and W. C. Meisenhelder. J. Am. Chem. Soc. 73, 1434-7 (Apr. 1951). Studies were made of the composition, properties, and structure of copolymers of 2-chloroallyl linoleate and styrene. These were prepared by bulk polymerization with benzoyl peroxide at 80°C., with stannic chloride at room temperature, and by emulsion polymerization in the presence of potassium persulfate at 50°C. The ester content of the copolymer was dependent on the monomer ratio, the amount of catalyst, and the type of polymerization. Self-polymerization did not occur.

with benzoyl peroxide as catalyst. As the ester content of the polymers was increased to 27% (one ester per nine styrene units), the softening temperatures and intrinsic viscosities were lowered. Polymers containing a higher proportion of ester were infusible and largely insoluble. By analysis of the copolymers after saponification it was shown that approximately 83% of the ester polymerized with styrene through chloroallyl double bonds, and 17% through linoleic double bonds. In the infusible polymers, cross-linking occurred through linoleic side-chains.

COMPOUND CURVED HONEYCOMB CORE MATERIAL FOR SANDWICH PANEL CONSTRUCTION. A. H. Herbst. SPE J. 8, 13-14, 22 (Jan. 1952). Compound curved honeycomb core materials made of glass fabric, glass mat, or paper bonded with polyester or phenolic resins are described.

Molding and Fabricating

COMPUTATION AND ACCOUNTING FOR PLASTICS MACHINERY. S. H. Withey. Brit. Plastics 25, 26-30 (Jan. 1952). To ensure the highest productivity and the most efficient and economical manufacture in the plastics industry, it is necessary to employ the most modern units and groups of machinery and plant. This may be impossible unless users make adequate provision for depreciation due to wear and tear, obsolescence, and other deteriorating factors. The author outlines suitable systems of internal check and control, giving examples of methods of accounting and of building up reserves to meet machinery replacements.

SULFONYL HYDRAZIDE BLOWING AGENTS FOR RUBBER AND PLASTICS. B. A. Hunter and D. L. Schoene. Ind. Eng. Chem. 44, 119-22 (Jan. 1952). A new series of sulfonyl hydrazide blowing agents for rubber and plastics is described and the best of these, *p,p'*-oxybis(benzenesulfonyl

hydrazide), is discussed in some detail. The compound appears to be nontoxic and, on heating in the range of 130° to 160° C., produces nitrogen as the result of an internal oxidation-reduction reaction. The residue is polymeric, odorless, non-staining, and nondiscoloring. The material has little effect on the cure rate and stability of rubber and plastics. Through the use of *p,p'*-oxybis(benzenesulfonyl hydrazide), expanded products can be obtained from a variety of rubbers, plastics, and rubber-resin blends. The products are characterized by a fine, uniform cell structure. Either cellular or open-celled products can be obtained, depending on the processing techniques employed. Volume expansions of ten- to fifteen-fold can readily be realized. The blowing agent may be incorporated in plastics and also in rubber and resin mixes on a mill, where its relatively high decomposition point is an advantage in preventing premature blow.

DEVELOPMENTS IN THE BARREL-POLISHING OF PLASTICS. Brit. Plastics 25, 24-5 (Jan. 1952). New developments in the barrel-polishing of plastic products are described.

Applications

TRENDS IN INDUSTRIAL PIPING. W. H. Shearon, Jr. Chem. Eng. News 30, 316-21 (Jan. 28, 1952). New developments in industrial piping are reviewed. The properties and applications of piping made of glass, styrene-butadiene, glass fiber-polyester, vinylidene chloride, polyethylene, polyvinyl chloride, cellulose acetate butyrate, and phenolic plastics are reported. Other new developments reported are metal pipes lined with glass and plastics.

PERSONNEL PROTECTION BY PVC. Brit. Plastics 25, 3-6 (Jan. 1952). Protective clothing made for workers in the chemical, food, and other industries where workers come into contact with corrosive and toxic materials is described. This clothing is made of unsupported polyvinyl chloride in various thicknesses and of fabrics coated with polyvinyl chloride.

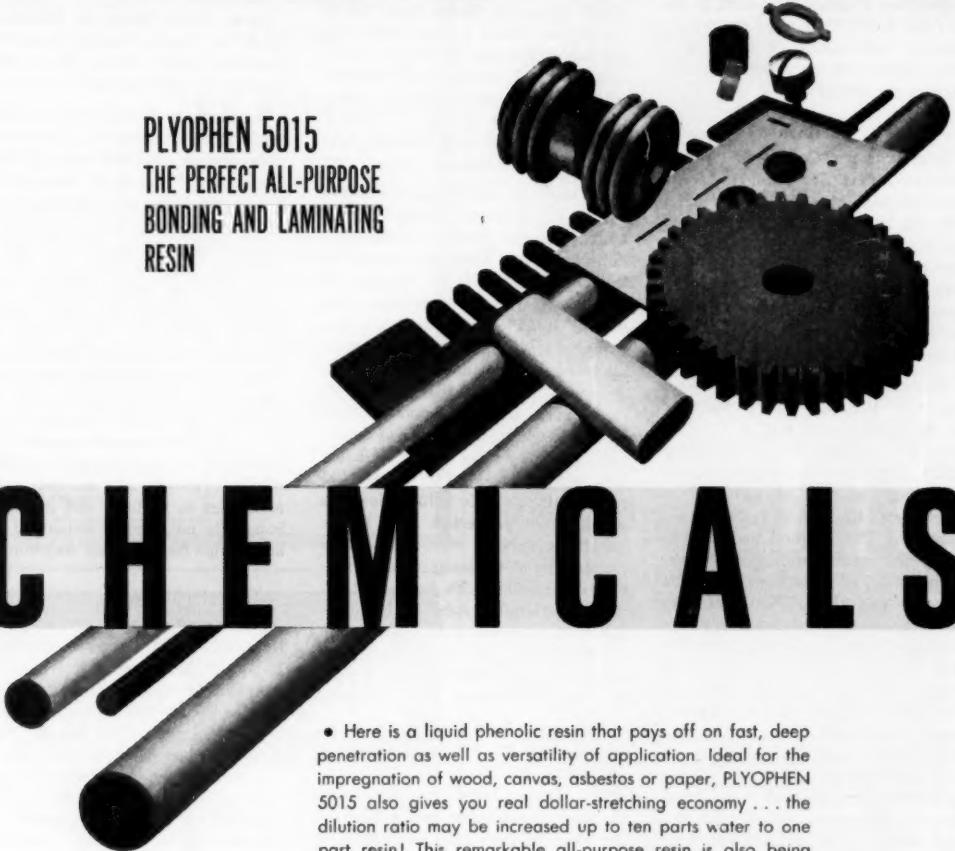
BONDING OF FRICTION FABRIC. G. S. Learmonth. Plastics (London) 16, 340-1 (Dec. 1951). The bonding of brake linings and clutch facings to brake shoes and clutch disks, re-

* Reg. U. S. Pat. Office.

REICHHOLD

PLYOPHEN 5015
THE PERFECT ALL-PURPOSE
BONDING AND LAMINATING
RESIN

CHEMICALS



- Here is a liquid phenolic resin that pays off on fast, deep penetration as well as versatility of application. Ideal for the impregnation of wood, canvas, asbestos or paper, PLYOPHEN 5015 also gives you real dollar-stretching economy . . . the dilution ratio may be increased up to ten parts water to one part resin! This remarkable all-purpose resin is also being used by some manufacturers in the production of Compreg. For further information and a working sample, write direct to:

REICHHOLD CHEMICALS, INCORPORATED

630 Fifth Avenue, New York 20, New York

SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • PHENOL • GLYCERINE
PHthalic Anhydride • Maleic Anhydride • Sodium Sulfate • Sodium Sulfite



Creative Chemistry...Your Partner in Progress

Plants: Detroit, Mich. • Brooklyn, N. Y. • Elizabeth, N. J. • South San Francisco and Alameda, Calif. • Tuscaloosa, Alabama • Seattle, Wash. • Chicago, Illinois
Charlotte, N. C. • Liverpool, England • Paris, France • Sydney, Australia • Hamburg, Germany • Naples, Italy • East London, South Africa • Barcelona, Spain
Wienert, Austria • Buenos Aires, Argentina • São Paulo, Brazil • Stockholm and Älvkarleby, Holland • Torreto, Port Moly, and Montreal, Canada
Osaka, Japan • Göteborg, Sweden • Zürich, Switzerland

spectively, is discussed. The types of brake linings and clutch facings, the history of bonding these materials, and some experimental results are described briefly.

PLASTIC BELTING FOR UNDERGROUND CONVEYORS. Plastics (London) 17, 15, 10 (Jan. 1952). Conveyor and transmission belts made of fabric and fiber reinforced polyvinyl chloride plastics are described.

Coatings

IMPROVING THE CORROSION RESISTANCE OF METAL SURFACES. A. L. Alexander. *Elec. Manuf.* 49, 112-15, 258, 260, 262, 264, 266 (Feb. 1952). Methods for cleaning metal surfaces and coating them with corrosion inhibitors in preparation for applying organic coatings are reviewed critically. Current research in this field is discussed.

DIFFUSION OF SODIUM CHLORIDE THROUGH VARIOUS PAINT SYSTEMS. W. W. Kittelberger and A. C. Elm. *Ind. Eng. Chem.* 44, 326-9 (Feb. 1952). A method of determining the instantaneous rate of diffusion of electrolytes through organic films is described. This method was used to study the relationship between the permeability of paint films to sodium chloride and their effectiveness as metal-protective coatings. The paints employed were representative materials whose relative merits have been established through years of use. Most of these paint systems offered considerable resistance to the diffusion of sodium chloride under a concentration gradient. Those known to possess good metal-protective properties maintained this high impermeability for some time, while other coatings lost it rapidly. The rate of loss of sodium chloride impedance was more closely related to the rate of decrease in the electrolytic resistance of the system than to the changes in the membrane potential of the films.

Properties

LABORATORY EVALUATION OF MATERIALS FOR MARINE PROPULSION GEARS. M. R. Gross. *ASTM Preprint*, 16pp. (1951). The pitting resistance, breakdown properties, and root fatigue strength of materials for marine gear applications were determined. The materials included steels, non-ferrous metals, and five plastics. Four of the plastics were

cotton fabric phenolic laminates and the other an unfilled polyamide resin. The breakdown limit of the laminated phenolics varied from 11,000 to 16,000 p.s.i.; the value for the polyamide was 13,000 p.s.i. The load carrying capacity of the laminated phenolics varied from 135 to 190 lb. per linear in.; the value for the polyamide was 190 lb. per linear inch. The high values were obtained with the laminated phenolic reinforced with 10 oz. cotton fabric. Those reinforced with heavier fabrics gave lower values.

MECHANICAL AND OPTICAL PROPERTIES OF HEAT-SHAPED PLEXIGLAS M 33 UNDER TENSILE STRESS. H. Peukert. *Zeitschrift des Vereines Deutscher Ingenieure* 93, 831-35 (Sept. 11, 1951). A series of tests was conducted on Plexiglas in both untreated and heat-deformed state applying constant and gradually increasing tensile loads. The tests revealed a linear dependence of birefringence on the degree of deformation. The critical degree of heat-deformation appears to be near 95 percent. Below this value, Plexiglas exhibits the properties of a brittle substance; above this point, it is marked by a tendency toward viscous deformation with permanent set. The functional graphs of birefringence vs. creep elongation permit the determination of a characteristic optical constant which serves to predict the deformation.

PREDICTING FILM DURABILITY. V. L. Simril and D. W. Flierl. *Modern Packaging* 25, 130-4, 176, 178 (Dec. 1951). Simple laboratory tests may be used to rate films and papers in the order of their relative resistance to failure when used in making packages. Laboratory tests on single sheets of film or paper found most useful for this purpose measure impact and tear strengths and flex life. Failures of the heavier packages and those containing the denser materials are usually caused by impact forces received when the carton in which they are packed is dropped or otherwise roughly jolted. The lighter weight and less dense packages are most likely to fail because of flexure of their walls due to vibration as a result of freight-car or truck motion. Simulated use tests involving separate drop and vibration tests demonstrate that the relative ability of any group of materials to resist

drop damage will not be the same as their relative ability to resist vibration damage. Therefore, no one laboratory test may be used as a means of predicting the relative merits of a group of materials to withstand both types of abuse.

SOME BASIC IDEAS ON ADHESION. N. A. De Bruyne. *Plastics (London)* 17, 308-9 (Nov. 1951). Some basic concepts on adhesion are reviewed.

SORPTION OF WATER VAPOR BY PROTEINS AND POLYMERS. IV. B. Katchman and A. D. McLaren. *J. Am. Chem. Soc.* 73, 2124-27 (May 1951). The water vapor sorption isotherms of a number of polymers and proteins were obtained in an effort to determine the relative efficiency of site adsorption by polar groups. The sorption capacity of polar groups (ether, hydroxyl) depends on the structure of the polymer. Ester linkages have very little affinity for water vapor. The carboxyl group, like the hydroxyl group, has a strong affinity for water. The over-all results indicate that a one-to-one correlation of polar groups and sorbed water molecules in proteins and polymers is usually not seen as structural relationships tend to limit sorption.

Testing

METHOD OF COLLOID TITRATION (A NEW TITRATION BETWEEN POLYMER IONS). H. Terayama. *J. Polymer Sci.* 8, 243-53 (Feb. 1952). A general discussion of the method of colloid titrations is given. This new titration method is based on the stoichiometric combination of positive and negative colloid ions. The end point is decided by indicators (known as metachromatic coloring matters) like toluidine blue. The standard colloid reagents are P.V.S.-K (potassium salt of polyvinyl alcohol sulfate) and Macramin (*N*-polymethylated chitosan derivatives). The typical operations of this method are described briefly: the direct, indirect, and differential titration methods. The colloid titration curve is somewhat different from the acid-base titration curve obtained potentiometrically, but it is characteristic and reproducible under definite conditions and so it is useful in quantitative and qualitative analysis. This titration may be carried out even under extraordinary dilute conditions (5×10^{-4} N) and the entire process is quite similar to the usual

quality polystyrene

lacquer
by pioneer

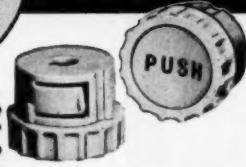
There is nothing spectacular in the polystyrene lacquer we have to offer. It is no prima donna. It will work for you with the things you desire and require in your production—excellent gloss, flow, mileage, blush resistance, the best possible adhesion, and attractive colors. The quality is uniform and doesn't vary from one shipment to the next. We will be happy to supply our standard colors or match yours.

Lacquers for the Plastic Industry

Pioneer
Lacquer Corp.
Cherry Valley, Mass.



CHOICE OF THE LEADERS



Quite a number of America's leading manufacturers are today being served by this old established Plastics Molding organization.

And typical of the many fine products Sinko makes for them is the Defroster Push Button Assembly (and its components) here pictured. This and other important items, including Vegetable Crispers, Butter Storage Units, Sterile Lamp Guards, Knobs, etc., are being fabricated for the 1952 Admiral Refrigerator.

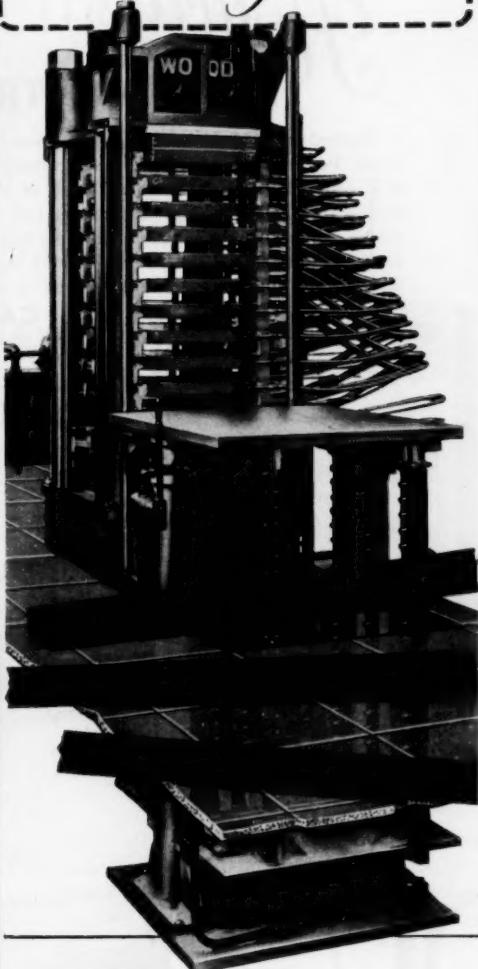
Sinko molds all thermoplastics, including Nylon; and has complete facilities for design and engineering, mold making, metal-plastic fabricating, 2 and 3 color plastic spraying, hot stamping, and assembling.

WE INVITE INQUIRIES ON YOUR MOLDING NEEDS!

Sinko

MANUFACTURING & TOOL CO.
3137 W. GRAND AVENUE • CHICAGO 22, ILLINOIS

If it's an **R. D. WOOD**
... It's Good *



With automatic pressure and control system, this 285-ton, 10-opening platen press is designed for laminating and polishing plastic sheets.

R. D. WOOD COMPANY
PUBLIC LEDGER BUILDING, PHILA. 5, PA.

Established 1808

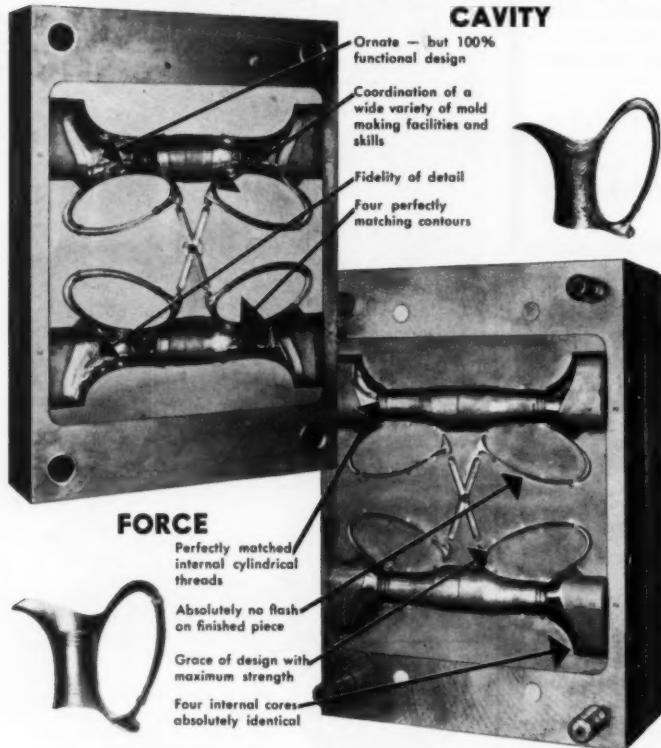
HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE
ACCUMULATORS • ALLEVIATORS • INTENSIFIERS

*FIND OUT WHY. SEND FOR YOUR FREE COPY OF OUR
NEW PHOTOGRAPHIC BOOK OF PLANT FACILITIES.

TRIFLES MAKE PERFECTION...
BUT—

Perfection IS NO TRIFLE!

A finished molded plastic product is *never* better than the mold. Perfection in a plastic product calls for painstaking skill and craftsmanship in every detail of the mold making. Success in manufacturing, assembling and selling a perfect plastic product is practically guaranteed when you use a Parker mold. A perfect mold is *always* the least expensive. Here are demonstrated some of the details that add up to PERFECTION.



Investigate the flexibility of Parker's facilities
SEND FOR THE PARKER GREEN BOOK TODAY!

THE
PARKER
STAMP WORKS, INC.
PLASTIC MOLD DIVISION
FRANKLIN AVENUE • HARTFORD, CONNECTICUT

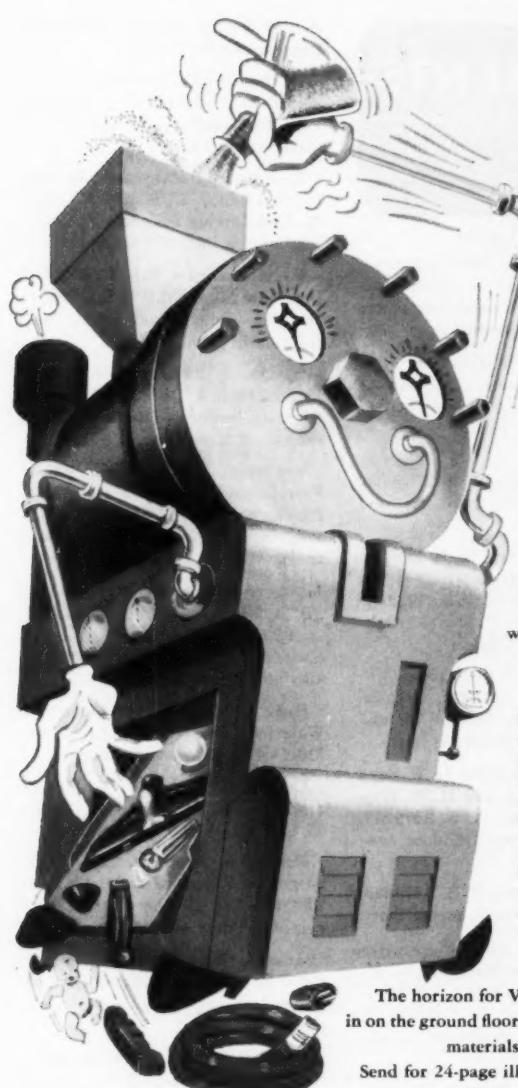
acid-alkali titration. The precision is below \pm ca. 5% if the method is carefully followed.

FLEXING-TEST DEVICE. P. A. Gelber and J. H. Bowen, Jr. *Modern Packaging* 25, 125-8, 178-9 (Jan. 1952). A laboratory flexing test is described and results obtained with it are reported. The device is suitable for testing films and similar laminated packaging materials.

COLORIMETRIC DETERMINATION OF METHYL CELLULOSE WITH ANTHRONE. E. P. Samsel and R. A. DeLap. *Anal. Chem.* 23, 1795-7 (Dec. 1951). The anthrone method is useful for the determination of methyl cellulose mixed with other carbohydrate materials. By combining methoxyl determinations, selective solubilities (particularly in hot water), and colorimetric determinations of carbohydrates by the anthrone method, various mixtures can be analyzed successfully. In some cases it is necessary to know what viscosity methyl cellulose and what other carbohydrate are present in order to obtain most accurate results. Methyl cellulose can be determined to an accuracy of approximately \pm 5% by the above method.

Chemistry

PRECIPITATION POINT IN PHENOLIC RESINS AND ITS EVALUATION. K. B. Goldblum. *Ind. Eng. Chem.* 44, 359-62 (Jan. 1952). Precipitation point, a tool in the study of the chemistry of phenolic resins, is defined and described. The effect of the nature of the catalyst on the precipitation point is discussed. The precipitation point groups catalysts into two classes: 1) alkaline catalysts and 2) ammonia, primary amines, and acids. Class 1 catalysts have two subclasses: strongly alkaline catalysts, and secondary and tertiary amines. Class 2 catalysts have two subclasses: ammonia, and primary amines and acids. Class 1 is distinguished by an initial increase followed by a decrease in precipitation point with time, while Class 2 is marked by a continual decrease. Data regarding the effect of catalyst concentration, temperature, and substituent groups on the precipitation point data are given. Some speculation with regard to the different course of the reaction for each class and subclass of catalysts is made.



Get more out of equipment!

Creative thinking can mean broader markets

Your molding equipment can do more than you may think — teamed with VINYLITE Brand Plastic *flexible* molding compounds! These versatile materials can be fabricated with your present machines . . . make possible a multitude of new products . . . open up limitless profit possibilities without investment in new equipment. Look over this unique list of properties. Think of the yet-to-be-discovered places where they will do jobs better...faster...more economically.

Flexibility

to almost any degree from soft and rubbery to semi-rigid.

Color

in practically every shade . . . in transparent, opaque or translucent form with lustrous finish.

Durability

. . . non-fading, abrasion-resistant . . . deliver extra-long service.

Resistance to oils

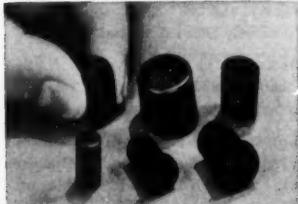
. . . most chemicals, corrosive atmospheres, grease, water, alkalis.

Adaptability

to high speed injection molding or extrusion. The temperature range for successful molding is highly flexible.

The horizon for VINYLITE Plastic flexible compounds is almost unlimited. Get in on the ground floor. Whether your projects are military or civilian or both, these materials deserve your careful consideration. Learn more about them. Send for 24-page illustrated booklet, "VINYLITE Resins and Plastics—Extrusion and Molding Materials." Address Dept. MW-7

Current successful applications for VINYLITE Plastic flexible compounds



Umost protection for tube and pipe ends and threads during shipping, storage, handling, is given by caps and plugs molded from VINYLITE Plastic flexible compounds.



Abrasion-resistant parts for vacuum cleaners injection molded of VINYLITE Plastic flexible compounds are quickly produced, give long, lasting service, won't mar furniture.

Vinylite
BRAND
PLASTICS



BAKELITE COMPANY

A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N.Y.

U. S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25¢ each.

CELLULOSE DERIVATIVES. G. O. Funderburk (to Du Pont). U. S. 2,579,381, Dec. 18. Water insolubilized cellulose compositions containing aluminum polyborate.

HOLLOW ARTICLES. E. E. Mills, U. S. 2,579,390, Dec. 18. Hollow plastic articles.

CONTAINERS. H. S. Ruckberg, U. S. 2,579,399, Dec. 18. Machine for making containers from plastic tubing.

SILICON POLYMERS. N. D. Cheronis (to E. L. Gustus). U. S. 2,579,418, Dec. 18. Resinous products containing silicon-nitrogen chains.

RESINS. C. E. Gleim (to Wingfoot). U. S. 2,579,426-7, Dec. 18. Allyl amine carbonate polymers.

POLYMERIZATION. W. T. Miller (to M. W. Kellogg). U. S. 2,579,437, Dec. 18. Process for polymerizing trifluorochloroethylene.

POLYMERIZATION. H. F. Park and H. A. Walter (to Monsanto). U. S. 2,579,442, Dec. 18. Polymerization of unsaturated compounds in the presence of cyanuric triazide.

POLYMERS. A. E. Polson (to Du Pont). U. S. 2,579,451, Dec. 18. Dissolving polyacrylonitrile in an oxy acid and coagulating in a suitable liquid.

ACRYLIC ESTERS. J. E. Hansen and T. J. Dietz (to U. S.). U. S. 2,579,492, Dec. 25. Heating a polymethylene-diamine with a polyacrylate to vulcanize.

VINYL RESINS. J. G. Hendricks (to National Lead). U. S. 2,579,572, Dec. 25. Light stabilized vinyl chloride resins containing phosphite salts.

CYANOETHYLATION. B. W. Hawk and C. M. Langkammerer (to Du Pont). U. S. 2,579,580, Dec. 25. Cyanoethylating in the presence of a polyquaternary ammonium hydroxide resin.

POLYMERIZATION. H. F. Minter and

M. M. Leven (to Westinghouse). U. S. 2,579,596, Dec. 25. Polymerization of vinyl containing monomers under controlled conditions.

HOT MELT. G. N. Pyle and J. S. Tingley (to Hercules). U. S. 2,579,755, Dec. 25. Hot melt composition containing ethyl cellulose and an oxalic acid ester.

RESIN. A. Russell, U. S. 2,579,759, Dec. 25. Resins from hydroxyformyl acetophenone.

INJECTION MOLDING. W. H. Fellows and C. W. Burnham (to Fellows Gear Shaper). U. S. 2,579,809, Dec. 25. Leakage prevention device for injection molding machines.

EXTRUSION. J. A. Gialanella (to Celanese). U. S. 2,579,815, Dec. 25. Apparatus for production of extruded articles of improved finish.

CELLULOSE DERIVATIVES. G. W. Seymour, B. B. White, and H. W. Kirshen (to Celanese). U. S. 2,579,873, Dec. 25. Morpholyn cellulose acetate.

MOLD. M. Brucker, U. S. 2,579,898, Dec. 25. Mold for heat curing thermosetting resins.

RESIN. R. Lindenfelser and C. M. Michand (to American Cyanamid). U. S. 2,579,939, Dec. 25. Aminoplast resin containing guanidine monostearate.

LAMINATE. F. L. Minnear (to Continental Can). U. S. 2,579,949, Dec. 25. Glass-fiber composites laminated with flexible thermosetting resin.

COATING. F. R. Spencer (to American Cyanamid). U. S. 2,579,980, Dec. 25. Benzoguanamine resins in surface coatings.

TABLEWARE. A. A. Varela and R. J. Schupp (to American Cyanamid). U. S. 2,579,985, Dec. 25. Benzoguanamine-melamine formaldehyde molding compositions.

COPOLYMERS. W. J. Sparks and P. E. Hardy (to Standard Oil). U. S. 2-

580,050, Dec. 25. Styrene-olefin copolymers containing a wax.

DRYING OIL. M. J. Murray (to Universal Oil Products). U. S. 2,580,184, Dec. 25. A mixture of copolymers of cyclic polyolefins.

SULFONATED POLYSTYRENE. M. Baer (to Monsanto). U. S. 2,580,271, Dec. 25. Crosslinking sulfonated polystyrene with a methylol aminoplast.

POLYMERIZATION. T. Boyd and F. J. Lucht (to Monsanto). U. S. 2,580,277, Dec. 25. Polymerization of vinyl chloride in granular form.

RESINS. J. Fanti (to Monsanto). U. S. 2,580,289, Dec. 25. Styrenated alkyl-melamine sulfonamide ether resins.

POLYVINYL CHLORIDE. E. W. M. Fawcett and A. Milien (to Anglo-Iranian Oil). U. S. 2,580,290, Dec. 25. Polyvinyl chloride plasticized with an ester and a petroleum extract.

POLYVINYL CHLORIDE. H. L. Johnson and A. P. Stuart (to Sun Oil). U. S. 2,580,301, Dec. 25. Polyvinyl chloride plasticized with a mixture of poly-alkylated benzophenones.

SNAP HINGE. R. P. Magnenat (to Waterbury Companies). U. S. 2,580-310, Dec. 25. Plastic snap hinge.

CELLULOSE ESTERS. V. R. Grassie (to Hercules). U. S. 2,580,351-2, Dec. 25. Sulfoethyl ethers of cellulose.

POLYVINYL ALCOHOL GELS. D. E. Sargent (to General Aniline). U. S. 2,580,362, Dec. 25. Thermo-reversible gels of polyvinyl alcohol.

ACRYLONITRILE. R. G. Beaman (to Du Pont). U. S. 2,580,393, Jan. 1. Polyacrylonitrile-organic base composition.

VINYL HALIDES. T. C. Patton and L. J. Jubanowsky (to Baker Castor Oil). U. S. 2,580,460, Jan. 1. Light stabilizer for polyvinyl halides.

GASKET. C. M. Hobson, Jr. (to U. S. Gasket). U. S. 2,580,546, Jan. 1. Chemically inert plastic gasket.

MOLDING. L. H. Morin. U. S. 2,580,816, Jan. 1. Method of forming plastic castings with metallic inserts.

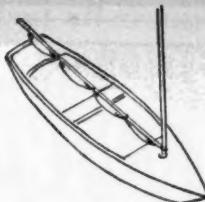
CABLE. T. J. Rhodes (to U. S. Rubber). U. S. 2,580,838, Jan. 1. Coaxial cable with helical plastic insulation.

SILOXANES. C. Shaw, W. E. Smith, and H. G. Emblem. U. S. 2,580,852, Jan. 1. Preparation of siloxanes by

**DRY
AND
HIGH
MAKE**

ATLAC DRY POLYESTER RESINS

**THE
"BUY"!**



Atlac dry polyester resins are easier to handle. What's more, they have longer shelf life, better wettability, and better adhesion.

Atlac dry polyester resins make possible plastic products with high wet strength retention, high electrical characteristics, high resistance to acids, and high dimensional stability.

Atlac dry polyester resins permit you to "tailor" your formulations for binding, lamination, and molding compounds to meet particular specifications.

Write today for further information.

Atlac: Reg. U. S. Pat. Off.



Industrial Chemicals Department

ATLAS
POWDER COMPANY
WILMINGTON 99, DELAWARE
Offices in Principal Cities
ATLAS POWDER COMPANY, CANADA, LTD.
BRANTFORD, CANADA

**PRIME
CONTRACTORS
SEE
ACCURATE
FOR
MILITARY
COMPONENTS**

The manufacture of molded plastics for devices for military requirements is one of our specialties... thousands of military parts are in present production.

Considerate and experienced handling of your plastic molding problems is available thru ACCURATE SERVICE where you will find ample, modern facilities to meet your every plastic molding requirement... at MAXIMUM efficiency and economy.

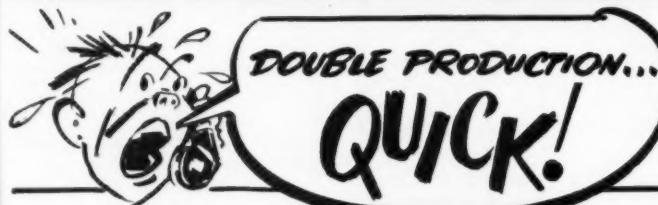


ACCURATE MOLDING CORPORATION 35-20 48th AVENUE LONG ISLAND CITY, N.Y.



SEND your specifications
NOW! We invite your
toughest problems...
...NO OBLIGATION

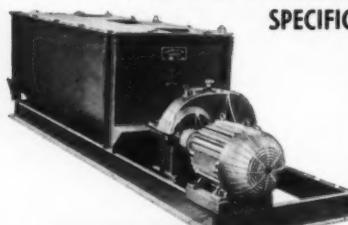
SPESIALISTS IN
SMALL RUNS
USING
HARD MOLE



THE BAILEY MIXER

- FOR A BETTER MIXING JOB —
- THE WAY TO REDUCE OPERATING COSTS

SPECIFICALLY ADAPTED TO PLASTICS!



ROUNDED CORNERS
for quicker—more
complete cleaning
to assure pure dyes
every time!

R. N. BAILEY CO., INC.

11 W. 42nd St.
New York 18, N.Y.

THE BAILEY MIXER ELIMINATES SOLIDIFYING ON HOT SURFACES! Now—you can pre-mix before loading into your banbury or calender—shortening cycle time—increasing production and boosting efficiency all along the line.

Here is up-to-the-minute scientific construction with the very latest improvements in precision details. More efficient cleaning—empties quicker—more thoroughly—more basic body support—new mixing element—increased mixing intensity.

Write now for full details and the many reasons why such companies as Monsanto, American Cyanamid, Borden, Ross & Roberts, Resiloid, Ideal Plastics, Armstrong Rubber, and others—all use Bailey Mixers! We have a complete line of scrap preparation equipment including sifters, cutters, shredders, batch dumpers, and others.

reacting dialkyldichlorosilanes with cupric oxide.

COPOLYMERS. J. A. Arvin and W. B. Gitchel (to Sherwin Williams). U. S. 2,580,876, Jan. 1. Copolymers of styrene and rosin.

Sheet Forming. G. W. Borkland. U. S. 2,580,883, Jan. 1. Apparatus for heating and pressing thermoplastic sheet.

COPOLYMER. J. G. Erickson and W. M. Thomas (to American Cyanamid). U. S. 2,580,901, Jan. 1. Copolymer of styrene, glycidyl acrylate, and glycidyl methacrylate.

COPOLYMERS. E. C. Chapin (to Monsanto). U. S. 2,580,997, Jan. 1. Plasticized copolymers of acrylonitrile and styrene.

POLYVINYL HALIDES. J. Dazzi (to Monsanto). U. S. 2,581,005-6, Jan. 1. Plasticizers for polyvinyl halides.

MOLDING. A. Kruzik (to Bata Norodnik Podnik). U. S. 2,581,031, Jan. 1. Machine for continuously homogenizing plastic masses.

ION EXCHANGE. G. J. Martin and J. Wilkinson (to National Drug). U. S. 2,581,035, Jan. 1. Therapeutically active anion exchange resin.

DAMPING STRUCTURES. F. M. Le Compte (to Curtiss-Wright). U. S. 2,581,193, Jan. 1. Method of forming a supporting and damping structure of plastic material in a hollow steel propeller blade.

HEATED FABRIC. D. C. Spooner, Jr. and M. S. Greenhalgh (to G. E.). U. S. 2,581,212, Jan. 1. Electrically heated fabric consisting of woven wires insulated with flexible polyamide resins.

INKS. K. A. Earhart and A. L. Davis (to National Distillers). U. S. 2,581,335, Jan. 8. Heat-convertible composition containing a steam-setting resin.

VINYL RESINS. J. E. Costa and O. R. McIntire (to Dow). U. S. 2,581,360, Jan. 8. Method of stabilizing vinyl chloride polymers.

PHENOLIC RESINS. M. DeGroote and B. Keiser (to Petrolite). U. S. 2,581,367 to 2,581,390, inclusive, Jan. 8. Oxyalkylated derivatives of solvent-soluble phenol-aldehyde resins.

EPOXIDE COMPOSITIONS. J. D. Zech (to Devoe and Raynolds). U. S.

2,581,464, Jan. 8. Halogen-containing polyethoxy polyepoxide compositions.

MOLDING MACHINE. C. C. Misfeldt. U.S. 2,581,550, Jan. 8. Extruder.

CELLULOSE ESTERS. B. B. White and E. Barabash (to Celanese). U.S. 2,581,565, Jan. 8. Mixed acetic and acetylvanillic acid esters of cellulose.

THERMOPLASTIC MANUFACTURE. J. Veit (to Duratube and Wire). U.S. 2,581,614, Jan. 8. Apparatus for manufacturing patterned thermoplastic strip material.

WOOD FIBER BASE MATERIAL. E. P. Cox (to Champion Paper and Fiber Co.). U. S. 2,581,635, Jan. 8. Removing the non-cellulosic constituents from wood by pulping, impregnating with phenolic resin, curing resin.

POLYVINYL ALCOHOL. R. C. Blume (to Du Pont). U.S. 2,581,832, Jan. 8. Hydrolysis of polyvinyl esters to polyvinyl alcohol with quaternary ammonium bases.

VINYL RESINS. A. Cresswell (to American Cyanamid). U.S. 2,581,836, Jan. 8. Applying guanylurea salts to vinyl articles to reduce static.

EMULSION POLYMERIZATION. W. Eggleston (to Du Pont). U.S. 2,581,844, Jan. 8. Aqueous polymerization of vinyl acetate in the presence of methanol.

VINYL RESIN. S. M. Kinzinger (to Firestone). U.S. 2,581,908, Jan. 8. Stabilized vinyl chloride resins.

VINYL FILMS. M. R. Radcliffe (to Firestone). U.S. 2,581,915, Jan. 8. Vinyl chloride resin films stabilized with cadmium alkyl mercaptide.

ADHESIVE. L. B. Kuhn (to Firestone). U.S. 2,581,920, Jan. 8. Rubber to metal adhesive comprising dichlorobutadiene resin and a chlorinated elastomer.

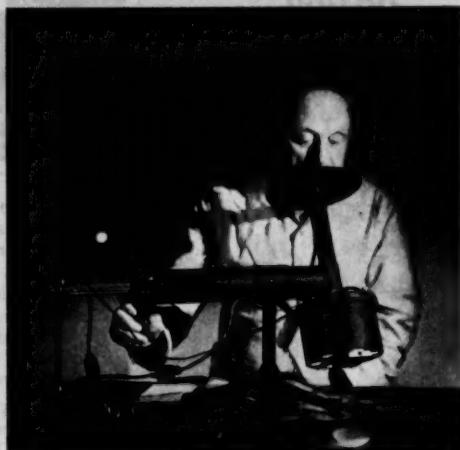
FRiction ELEMENTS. F. J. Groten and R. J. Reid (to Firestone). U.S. 2,581,926, Jan. 8. Resinous friction element and adhesives therefor.

PLASTIC SEALING. K. F. Spalding and F. V. Collins (to William F. Stahl). U.S. 2,581,977, Jan. 8. Electrically operated heat-sealing device.

CELLULOSE DERIVATIVES. C. L. Crane (to Eastman Kodak). U.S. 2,582,009, Jan. 8. Preparation of cellulose acetate-sulfates.

COATED PAPER. J. B. Hyde (to

TESTED
and
PROVED in Laboratory and in Commercial Usage



The Nigrometer Scale is used to measure the color value of Cabot's extensive range of color blacks

*The best all-around BLACK
for POLYETHYLENE*

CARBOLAC 2

Cabot's Carbolac 2 has the endorsement of manufacturers of best quality polyethylene products, because it gives uniform, excellent performance in plastics materials.

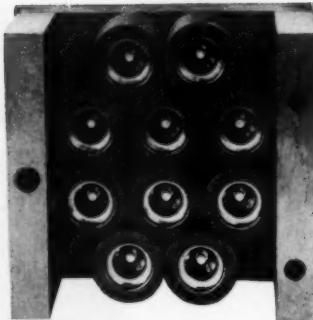
Carbolac 2 is what is termed in the industry a "high-color black", and the extremely jet tone which it imparts to polyethylene makes it the best black for use in this field. It is grit-free and easily dispersible in all polyethylene plastics compounds.

Carbolac 2 is manufactured to the highest standards of uniform quality and is tested every step of the way from beginning to end of the production process.



GODFREY L. CABOT, INC.
77 FRANKLIN STREET, BOSTON 10, MASS.

how
do you
determine
the
cost
of
a
plastic
mold?



Do you look at the price tag? Sometimes it's misleading! Take the so-called "bargain" mold, for example. As long as you use it, you never stop paying for it... in excessive rejects, headaches, and production tie-ups. For somewhere in its making somebody skimped on materials, care, or skill. To accurately determine how much a mold costs, measure the initial price against results.

And if you buy plastic parts outside, it pays to consult a reliable custom molder, backed by a skilled moldmaker. Together, they design and build a mold to fit the job. The extra care, skill, and better quality steels they use, more than pay for themselves in greater production of fast-selling parts.

For years, reputable moldmakers have relied on Carpenter Electric Furnace Mold Steels. If you're not already using Carpenter Mold Steels, discover the many advantages they offer. Send your order to your nearest Carpenter Mill-Branch Warehouse or Distributor, today. The Carpenter Steel Co., 112 W. Bern St., Reading, Pa.

Export Department: The Carpenter Steel Co., Reading, Pa.
"CARSTEELCO"



When you have mold work done outside, consult a custom molder backed by a reputable moldmaker!

*Write for
useful leaflet
on Samson
Extra!*

REINHOLD-GEIGER PLASTICS used Carpenter SAMSON EXTRA in the mold for this heat control knob. They report: "We changed to SAMSON EXTRA primarily for its greater core strength and hardness. The steel machines with ease, responds perfectly to heat treatment, polishes to a fine finish and gives long service life."

SPECIFY
Carpenter
MOLD STEELS
100% Acid Disc Inspected



Crown-Zellerbach). U.S. 2,582,037, Jan. 8. Coated paper, the coating comprising polyethylene and wax.

CELLULOSE TRIACETATE. C. J. Malm and C. L. Crane (to Eastman Kodak). U.S. 2,582,049, Jan. 8. Method for preparing cellulose triacetate.

POLYVINYL ACETATE. L. M. Minsk and E. W. Taylor (to Eastman Kodak). U.S. 2,582,055, Jan. 8. Polymerizing vinyl acetate in tertiary butyl alcohol.

ION EXCHANGE. D. G. Braithwaite and J. S. D'Amico (to National Aluminate). U.S. 2,582,098, Jan. 8. Phenol-aldehyde-amine anion exchange resin.

RESINS. E. D. Lee and R. J. Scheibauer, Jr. (to Interchemical). U.S. 2,582,139, Jan. 8. Resinous products of the reaction of styrene with Utah coal resins.

RESINS. L. J. Radi (to Interchemical). U.S. 2,582,160, Jan. 8. Butadiene-acrylonitrile copolymer containing Utah coal resin.

ION EXCHANGE. J. R. Dudley (to American Cyanamid). U.S. 2,582,194, Jan. 8. Polyamine-polyacrylate anion exchange resins.

CELLULAR PLASTIC. R. J. Brinkema (to Koppers). U.S. 2,582,228, Jan. 15. Producing a cellular composition from a phenol-resorcinol-formaldehyde resin and a blowing agent.

RESINS. J. C. Cowan and H. M. Teeter (to U.S.). U.S. 2,582,235, Jan. 15. Resins from maleic anhydride-alkyl oleate adduct and an alkylene diamine.

TEXTILE TREATMENT. C. G. Dodd (to U.S.). U.S. 2,582,239, Jan. 15. Treating thermoplastic textile fibers with long chain substituted phenol-aldehyde resins.

MOLDING APPARATUS. L. F. Kutik (to St. Regis Paper). U.S. 2,582,260, Jan. 15. Apparatus for molding thermoplastics.

RESINS. K. P. Monroe (to Standard Dyewood). U.S. 2,582,265-6, Jan. 16. Polyhydroxy phenol resinous tanning agents.

SHAPING. K. E. Stober (to Dow). U.S. 2,582,294, Jan. 15. Continuous method for cooling and shaping thermoplastics.

MOLDABLE COMPOSITIONS. H. P. Wohnsiedler and E. L. Kropa (to

MOSLO ANNOUNCES!

the New $\frac{3}{4}$ Ounce HORIZONTAL HYDRAULIC Model 70 INJECTION MOLDING MACHINE



Displayed for the first time at plastics show in Philadelphia the model 70 was the hit of the show. The #70 model horizontal hydraulic injection molding machine is an *all hydraulic machine*, capable of injecting all thermo plastics. Injection is made through the center of the mold. Clamping action is of the toggle type, hydraulically operated by means of a hand-operated valve. The hydraulic injection stroke is also operated by hand valve. An automatic feed mechanism and a safety gate with an electrical interlock are standard equipment. A simplified knockout plate removes molded parts and a built-in chute discharges the finished parts.

Low mold cost enables the custom molder to accept orders for small parts and short runs which can be run at a handsome profit.

There is a definite place for this machine in the industry for the manufacture of small plastic parts, experimental laboratories, schools and colleges and this machine should be a "must" for every commercial molder of plastics.

General Specifications

Maximum Pressure	13,250 psi
Mold Size	6x5x6 $\frac{1}{2}$
Maximum Mold Opening	4"
Maximum Casting Area	6 sq. inches
Plasticizing Capacity	7# per hr.
Injection Stroke	6"
Operating Temperature	150° to 650°
Vickers Hydraulic Power-Pak	
1 $\frac{1}{2}$ H.P. Motor	

Place Your Order Now

OTHER MODELS AVAILABLE:

- 2 $\frac{1}{2}$ oz. Duplimatic
- 2 $\frac{1}{2}$ oz. Standard and High Speed
- HC-75, $\frac{3}{4}$ oz. Hand Hydraulic

Phone Or Write

Moslo Enterprises

MOSLO MACHINERY COMPANY

2443 PROSPECT AVENUE • CLEVELAND 15, OHIO

MID-AMERICA PLASTICS, INC.

COLOR DIVISION

2443 PROSPECT AVE. • CLEVELAND 15, OHIO

Tested and Proven



accepted names

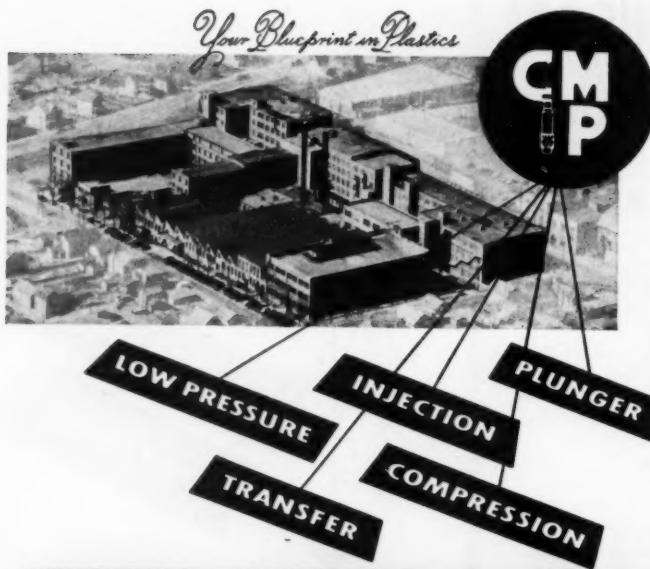
in the dry coloring field

Mid-America Plastics, Inc., in full production capacity, is supplying the industry with dry colorants. Our completely equipped laboratory and modern manufacturing facilities is formulating and compounding "Colorblende" the dry colorant, and "Dispersa" the wetting agent. You can get immediate delivery of "Colorblende" in 17 Bureau of Standards colors or specify any special colors.

We invite your inquiry—write today for our price list and Color Comparison Chart. "Colorblende" and "Dispersa" are packaged in convenient containers—in 50# or 100# units ready to color your crystal styrene in any mixing drum.

Quick—Easy—Dust Free—Economical

TERRITORIES OPEN FOR DISTRIBUTORS



Consolidated molded products corporation

SCRANTON 2, PENNSYLVANIA
SALES ENGINEERING OFFICES IN NEW YORK, BOSTON, BRIDGEPORT,
DETROIT, PHILADELPHIA, CLEVELAND, MILWAUKEE, INDIANAPOLIS



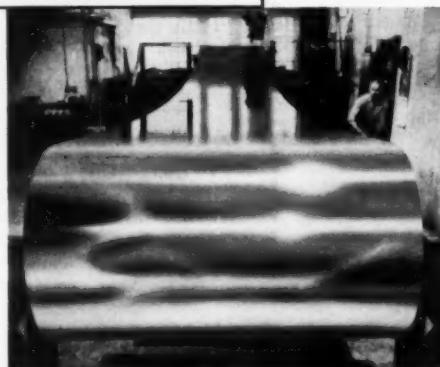
METALSMITHS STAINLESS STEEL ENDLESS CONVEYOR BELTS

Any Width and
Length Required
in One Piece

- Welded Endless
- Width and Camber controlled
- Polished to suit application
- Sanitary
- Non-corrosive

All Welds Finished to Belt Thickness

- Will increase production
- Carry product through cooling and conditioning tunnels
- Aid setting of plastics, rubber and special compounds
- Give product proper finish



Let our engineers quote on your requirements,
based on fifteen years of belt welding.

METALSMITHS

558 White St., Orange, N. J.

* This "Metalsmiths" belt is the widest, polished, one-piece, continuous stainless steel conveyor belt ever fabricated. Size 55 in. wide x 100 ft. long, finished to a mirror polish, for photographic film manufacture.

American Cyanamid). U.S. 2,582,303, Jan. 15. Moldable compositions of melamine-formaldehyde resin and an acrylonitrile copolymer.

POLYETHYLENE. W. A. Haine (to Carbide and Carbon). U.S. 2,582,327, Jan. 15. Process for powdering polyethylene.

VINYL RESINS. G. M. Powell and T. E. Mullen (to Carbide and Carbon). U.S. 2,582,354, Jan. 15. Dispersions of vinyl chloride resins in 2,6,8-trimethyl-4-nonenone.

POLYVINY ALCOHOL. D. E. Sargent (to General Aniline). U.S. 2,582,357, Jan. 15. Thermo-reversible gels of polyvinyl alcohol and 1,3,5-triazine.

DRYING OILS. H. S. Bloch and A. E. Hoffman (to Universal Oil). U.S. 2,582,411, Jan. 15. Olefin copolymers having drying properties.

TRIPOLYMER. E. M. Geiser (to Universal Oil). U.S. 2,582,425, Jan. 15. Tripolymer of coumarone-indene, a vinyl aromatic, and material from a hydrocarbon catalyst sludge.

DRYING OILS. A. E. Hoffman and H. S. Bloch (to Universal Oil). U.S. 2,582,434, Jan. 15. Production of olefinic drying oils.

POLYSTYRENE. H. S. Olson and R. C. Danison (to Diamond Alkali). U.S. 2,582,452, Jan. 15. Flame-resistant composition of polystyrene, chlorinated paraffin wax, and glycidyl oleate.

STRAIGHTENING APPARATUS. E. W. Larsen and J. G. Meyer (to Western Electric). U.S. 2,582,491, Jan. 15. Apparatus for straightening plastic rods or tubes.

COATINGS. K. P. Monroe (to Standard Diewood). U.S. 2,582,500, Jan. 15. Surface coatings containing ethers of catechol-type tanning agents.

POLYETHYLENE. B. A. Stiratelli (to Bell Telephone). U.S. 2,582,510, Jan. 15. Polyethylene that has been stabilized with sulfur plus a vulcanization accelerator.

RESINS. E. L. Kropa and H. P. Wohnsiedler (to American Cyanamid). U.S. 2,582,594, Jan. 15. Materials produced from a polyethylene-melamine.

RESINS. H. P. Wohnsiedler and E. L. Kropa (to American Cyanamid). U.S. 2,582,613-4, Jan. 15. Re-

action products of polyethylene-melamine with a phenol or an ethylene urea.

POLYMERIZATION. A. H. Gleason (to Standard Oil). U.S. 2,582,693, Jan. 15. Copolymerization of butadiene-1,3 and piperylene.

RESINS. E. L. Kropa and H. P. Wohnsiedler (to American Cyanamid). U.S. 2,582,704, Jan. 15. Reaction products derived from a polyethylene-melamine and an alkyl resin.

PHONOGRAPH RECORDS. J. W. Ayers (to Agrashell Inc.). U.S. 2,582,740-1, Jan. 15. Phonograph record compositions containing vinyl chloride resin, a synthetic rubber, and a lignocellulosic filler.

SPECTACLE FRAME. J. R. K. Russel and A. Prasser (to Spectator Optical Products). U.S. 2,582,798, Jan. 15. Method for manufacturing plastic spectacle frames.

POLYSILOXANE. R. O. Sauer (to G. E.). U.S. 2,582,799, Jan. 15. A novel silocane.

RESIN. D. Ramondt (to N. V. Ocrooien Maatschappij; "Activit"). U.S. 2,582,849, Jan. 15. Phenylene diamine-formaldehyde resins.

TEXTILE TREATMENT. M. R. Burnell and J. E. Lynn (to American Cyanamid). U.S. 2,582,961, Jan. 22. Treatment of textiles with resinous compositions for flameproofing.

EPOXIDE RESINS. S. O. Greenlee (to Devoe and Raynolds). U.S. 2,582,985, Jan. 22. Epoxide resins.

SURFACE TREATMENT. J. J. Strobel. U.S. 2,583,024, Jan. 22. Surface treating polyester-glass fabric laminates with resinous tetraethylene glycol dimethacrylate.

COPOLYMER. H. F. Minter, N. C. Foster, and M. M. Leven (to Westinghouse). U.S. 2,583,150, Jan. 22. Styrene-polyester copolymer for photoelastic studies.

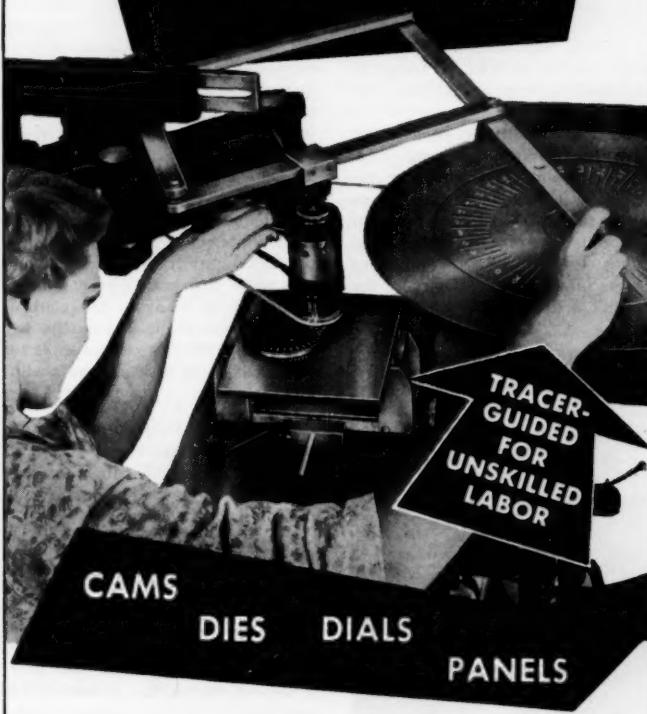
RESINS. E. A. Bevan and R. S. Robinson (to Reichhold). U.S. 2,583,204, Jan. 22. Reaction products of cyclohexanones and unsaturated dicarboxylic acids.

COATED PAPER. G. E. Niles (to Monsanto). U.S. 2,583,274, Jan. 22. Mineral-coated printing paper including a styrene-acrylic ester copolymer for the coating.

ENGRAVING • PROFILING VERTICAL MILLING

WITH THE *new hermes*

Engravograph



Write for literature describing:

1. Heavy Duty Engravograph (illustrated) Catalog H 20
2. Portable Engravograph Catalog IM 20

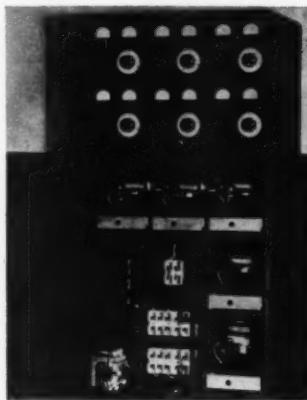
NEW HERMES, Inc. 13-19 University Place
New York 3, N.Y.

World's Largest Manufacturer of Portable Engraving Machines

NEW MACHINERY AND EQUIPMENT

HEAT CONTROL—Electronically metering the correct amount of voltage to the heater elements in accordance with variations in load conditions, a new heat control (Model MP-101) has been announced by The Modern Plastic Machinery Corp., 15 Union St., Lodi, N.J. This instrument gives stepless temperature regulation to electrically heated equipment and automatically holds the temperature within close limits. When used in company's extruders, it has been found possible to hold the temperature much more accurately than ever before.

These units can also be used for other applications involving close control of temperature. The equipment is completely electronic. There are no relays, motors, thyatron, or photocells, nor any mechanical valves, levers, etc. Two indicating meters are supplied. One, in the "brain" section, enables the operator



to tell at all times the current changes in the circuits of the heater elements. This is particularly valuable in cases where cooling must be used in order to overcome frictional heat. The other meter, in the "control" section, is used as an indicating device which enables the operator to tell at all times that the proper

temperature is being maintained. This meter also enables the operator to measure the amount of overshoot or undershoot of the voltage regulating system. The unit normally will handle load changes as much as five to one and is practically limited only by the size of the heater elements and the rate of heat dissipation in the equipment.

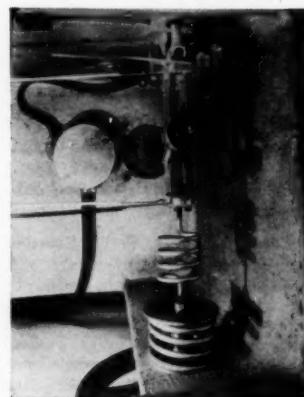
When used on the company's extruders, these units are matched and the control units will handle every temperature which might be required by the material being extruded. Ratings of instruments now in production range from 350 watts to 5 kilowatts. Standard units are available in 1500, 3000, and 5000 watt ranges. Special equipment is available to handle higher voltage ranges. It should be noted that the brain section and the control section are separate units. One brain section can be used with as many as ten control units. Therefore, it is possible, by using ten 5000-watt control units to control as much as 50 kilowatts with one brain unit.

ABRASIVE-BELT GRINDER—Used primarily for free-hand use with work which requires flat surfaces, deburring, squaring, chamfering, rounding, or polishing, a new all-purpose abrasive belt grinder for metal, wood, glass, and plastics applications (Model 506) has been announced by the Porter-Cable Machine Co., 3160 N. Salena St., Syracuse 8, N.Y. Equipped with a standard 6 in. belt which runs over a 12½ in. platen, the grinder is an economical size for medium work. It can be changed from vertical operation for smaller pieces to horizontal operation for machining larger or heavier pieces by simply loosening two hex nuts. The machine is also equipped with two-speed pulleys for 3300 to 4000 sfpm, which are balanced and run on heavy-duty ball bearings and which can be quickly changed for proper surfacing speed. A pretensioning device eliminates

need for releasing the entire idler tension pressure each time the belt is changed.

The machine is available in either of two forms—the dry model equipped with adjustable motor platform, removable and reversible cast iron platen, work rest, and chip basket; and the wet model which includes, in addition, a coolant system with belt driven pump, splash guard, and coolant. The dry model with its motor weighs 485 lb. and stands 38 in. high, 18 in. wide, and 30½ in. deep when in horizontal position, 56½ in. high, 18 in. wide, and 25 in. deep when vertical. The wet model, with motor, weighs 515 lb. and when used with the splash guard has a width of 24½ in. in either position. The drive unit is 3 hp., 220/440 volts, 60 cycle, 3 phase, 1750 r.p.m., and is totally enclosed.

FATIGUE MACHINE—By incorporating many of the features of its larger machines and by increasing the alternating force capacity of the super-

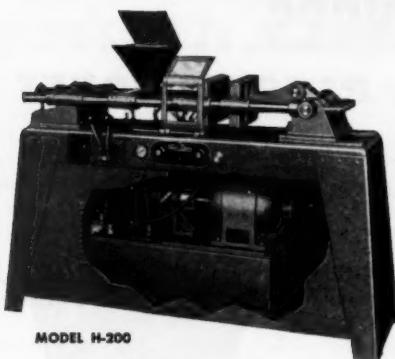
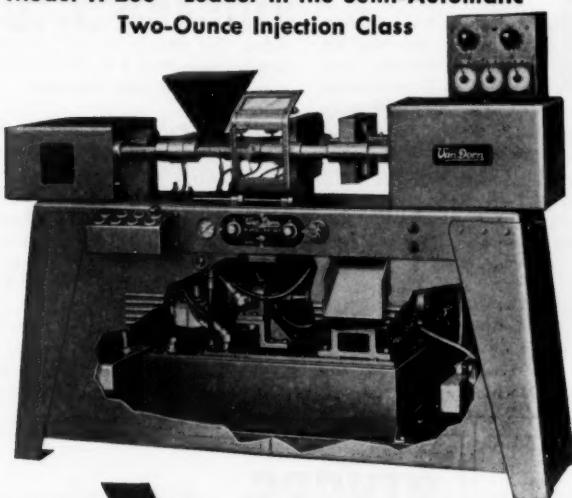


sed model to 25 lb., the Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. has redesigned its SF-2 fatigue machine. Featured in the new model SF-2 is an accessory preload attachment which can be added to the model to permit applying preload either in an up or down direction. Any pulsating load may be superimposed on a static preload within the capacity of the machine.

The new design also provides a tension-compression spring for inertia force compensation and a cage guided by flexure plates which absorb horizontal components of cen-

Produce Plastics Profitably With This VAN DORN Equipment

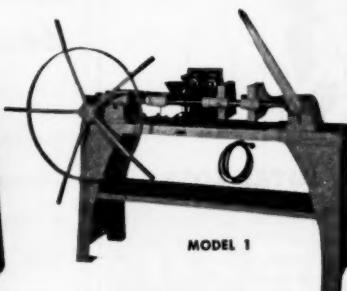
Model H-200—Leader in the Semi-Automatic Two-Ounce Injection Class



MODEL H-200

Power Operated, Lever Controlled Presses

2-oz. or 1-oz. capacity. These low-cost units operate 8 hours for under a dollar and use inexpensive molds. Can easily be set up in twenty minutes by one man.



MODEL 1



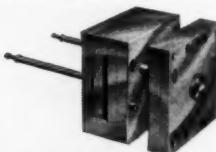
MODEL G-100

Manually Operated Press

1-oz. capacity. This press is ideal for smaller jobs, experimental work and technical training.

Plastic Grinder

Grinds up rejects, waste, etc., for re-use. Ruggedly made, designed for easy cleaning.



Mold Bases

Available from stock for all Van Dorn presses.

Write for Bulletins on this Equipment

trifugal force. Within this cage is an eccentrically mounted mass—with a micrometer screw adjustment—which is rotated at 100 r.p.m. by a $\frac{1}{4}$ hp. synchronous motor through flexible couplings. A scale on the cage indicates the centrifugal force produced by the revolving mass. Other specifications include $\frac{1}{2}$ -in. maximum travel of the loading yoke, testing speed of 1800 cycles per min., and graduations in 0.125-lb. increments on the dial load indicator.

The changes incorporated in the machine now make it possible for the unit to be used for the simulated service testing of small parts, instead of being limited to sheet metal specimens. The unit measures $19\frac{1}{4}$ in. wide by 25 in. long by $21\frac{3}{4}$ in. high.

TOGGLE CLAMPS—Designed so that it is possible to grip veneer and plastic faces without marring or scratching the surface being held, a new line of fast grip toggle clamps has been announced by Robert J. Kelly Mfg. Co., P. O. Box 61 (Broadway Sta.), Newport, R. I. The clamps, which provide fast adjustment and quick one-hand release, are available in several models—drill press clamp; wood-

working clamp; and welding clamp. All models are finished with cadmium plating and have a throat size of 4 in. by $2\frac{1}{2}$ inches. Also available is a series of horizontal handle clamps designed for a variety of applications including adaptation to individual toggle bar arrangement; work holding for repetitive processes where spindle member is fixed at a definite horizontal dimension; and operations on jigs and fixtures where vertical space is at a minimum.

WET BLAST SUPPLIES—A complete line of abrasives for wet blasting machines is available directly from the stock of American Wheelabrator & Equipment Corp., 1254 South Byrkit St., Mishawaka, Ind. Sizes range from 80 to 2500 mesh and are supplied in 50-lb. packages for easy charging of machines and for storage simplification. Anarust, a rust inhibitor, and Anaset, an anti-packing chemical, are also in stock.

WIRE TAKE-UP UNIT—Incorporating several new features, a take-up unit for electrical wire and cable manufacture has been designed by the Standard Machinery Co., Mystic,

Conn. The take-up has no gears or clutches and can operate at high production speeds quietly and with a minimum of vibration. The reel drive is by double V-belts, with a brake to automatically stop the reel as it is disengaged. A feature of the machine is the traverse mechanism, air-actuated and positive in operation. The reels are shifted in and out of engagement by air pressure and the reel is shifted to floor level to overcome the danger of dropping.

A choice of speed change methods for constant tension control is provided. The take-up is built in sizes to take reels from 6 to 36 in.; larger sizes can be specially furnished.

ELECTRONIC RECORDER—Electronically controlled null balancing system, which utilizes specially adapted differential transformers built into the housing for accuracy and high speed, is incorporated in a new electronic recorder (Model 51) introduced by Tinus Olsen Testing Machine Co., 1068 Easton Rd., Willow Grove, Pa. The null system rotates the recorder chart drum in direct proportion to the strain or deformation of the specimen under test and produces a

BE CAREFUL ABOUT TEMPERATURE



REJECTS ARE A TOTAL LOSS!

In molding plastics, the routine use of the Cambridge Mold Pyrometer will go a long way in preventing rejects because of off-colors, brittleness, soft centers, misshapes and low tensile strength. This instrument is accurate, rugged and instantly indicates the surface temperature of mold cavities. It is so convenient to use, molders like to and will use it.



Combination and Single Purpose Instruments

Send for bulletin 1948
CAMBRIDGE INSTRUMENT CO., INC.
3711 Grand Central Terminal, New York 17, N.Y.

CAMBRIDGE
MOLD • NEEDLE • ROLL
PYROMETERS

Bulletin 1948 gives details of these instruments.
They help save money and make better plastics.

HINGES... for PLASTIC BOXES

press-fit assembly

(Holds like

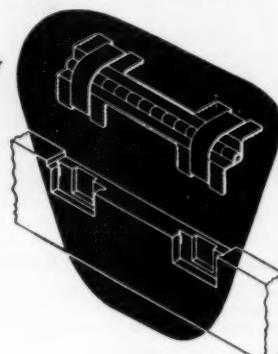
a drive-screw)

with

or without

double action

"C" Springs



GEISSEL *Mfg. Co., Inc.*

109 LONG AVENUE

HILLSIDE, N. J., U. S. A.

TOUGH!
Non-splintering
U. S. Royalite



... stands up to a rugged home life!

Bang 'em, kick 'em, wet 'em down with a hose, toys made of U. S. Royalite can take it!

This amazingly adaptable plastic is proving the solution to thousands of manufacturers' product problems.

Worried about spiraling production costs? U. S. Royalite may be your answer. It can be formed on *low-cost* tools in intricate and deep-drawn shapes.

Taking losses because of rough production line handling or shipping damage? Tough U. S. Royalite is highly resistant to impact.

Are costly finishing and coloring operations eating up dollars? U. S. Royalite is available in sheets *prefinished* and *color-permeated throughout* to your specifications.

Analyze your products against the many advantages of U. S. Royalite check-listed below. Let the engineering staff of the United States Rubber Company show you how you may improve your products and cut production costs with adaptable U. S. Royalite. Write Dept. MPR-1.

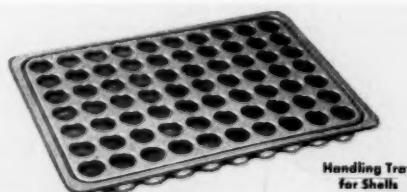
CHECK LIST of U. S. Royalite advantages

- ✓ Standard or Flame-resistant
- ✓ Lightweight
- ✓ Tough
- ✓ Non-splintering
- ✓ Non-warping, non-corrosive
- ✓ Impervious to oils, most acids, alkalies
- ✓ Highly resistant to impact
- ✓ Waterproof, stainproof
- ✓ Easily formed on low-cost tools
- ✓ Prefinished to your specifications
- ✓ Color-permeated throughout
- ✓ Available in sheets
- ✓ Stable under changing atmospheric conditions
- ✓ Exceptional electrical insulating qualities
- ✓ Low rate of heat conductivity

U. S. ROYALITE



Tote Boxes



Handling Tray for Shells



Stadium Seat



UNITED STATES RUBBER COMPANY

2638 NORTH PULASKI ROAD • CHICAGO 39, ILLINOIS

stress coordinate by horizontal movement of a pen. Accuracy of this coordinate is $\pm \frac{1}{2}$ division. Magnification, ranging from 1000:1 to 1:1, can be made available by use of a switch and may be changed without stopping test. Curves are plotted on letter size cross section paper held in place by a simplified clip.

The recorder may be applied to testing machines for tension, compression, and transverse testing. When used with beam and hydraulic gage types of machines, an additional electronic null system is necessary to drive the load pen.

Recorder is sensitive to 0.05% of full scale for each range and its calibration is not affected by component parts.

ROLLER MILLS—The latest development in the company's line of three roller mills, Model No. 52T, has been announced by Charles Ross & Son Co., 148-156 Classon Ave., Brooklyn, N.Y. Dispersion or particle size reduction is accomplished along the full production face of the rolls as easily removed hoppers ride off their outside taper. The three rolls revolve at specially determined differential

speeds; a front roll speed of 350 r.p.m. can be used without excessive heating because of the specially bored cooling chambers. The machine includes a balanced apron which assures uniform pressure of the thin take-off knife along the roll and eliminates the scoring of roll ends.

"Down time" for cleaning the machine is minimized by the easily detachable apron and special bearings in the adjusting handwheels for quickly disengaging the rolls. Calibrated indicating dials are used for sensitive and accurate setting of the rolls.

Available in sizes 14 by 32 in. and 9 by 24 in., the mills are equipped with heavy self aligning roller bearings and continually lubricated helical gears for quieter operation.

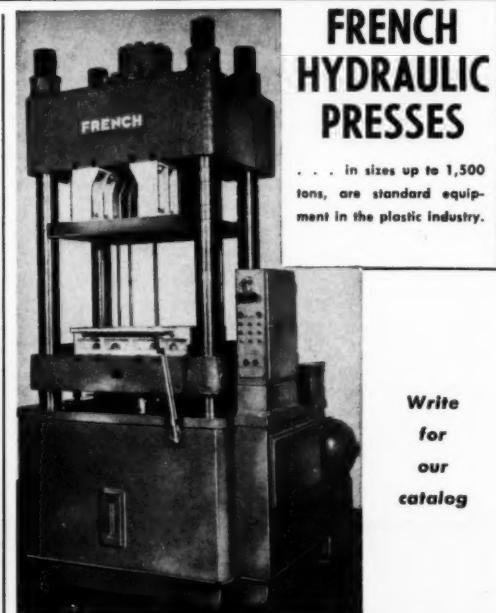
INJECTION MOLDING MACHINE—Capable of making a complete cycle in 9 sec., a new automatic 6-oz. pre-plasticizing injection machine, utilizing the Henry process, has been announced by Jackson & Church Co., Saginaw, Mich. The machine offers the same advantages as the larger pre-plasticizing units, which incorporate the variable pitch screw,

multi-stage extruder screw, single zone injection chamber, and hydraulically operated injection ram, and has the added feature of requiring only 30 sq. ft. of floor space. Designed for semi- or completely automatic operation on all thermoplastics, the new unit has a locking pressure of 180 tons and a potential projected area of 150 sq. inches. One person can operate a battery of five of these machines.

SPEED CONTROLS—Variable speed units with single reduction gears in ratings of 20 and 25 hp. has been announced by Sterling Electric Motors, Inc., 5401 Anaheim-Telegraph Rd., Los Angeles 22, Calif. These KFEA units are manufactured in speeds of 728 r.p.m. and lower, with infinite speed adjustment within the ranges of 2:1, 3:1, or 4:1. The drive has positive adjustment of pulleys; accurate maintenance of speeds under varying loads; belt tension in proportion to load; positive oil seals; single train helical gears; herringbone rotor; and direct-through ventilation. All ratings are available with either drip-proof or splash-proof construction.

**Plastics
Molding**
for America's
LEADING MANUFACTURERS
ALL MATERIALS — ALL METHODS

Northern
40 YEARS OF
PLASTIC MOLDING EXPERIENCE
INDUSTRIAL CHEMICAL CO.
11 ELKINS ST., SO. BOSTON, MASS., S0uth 8-4240
BRANCH OFFICES
441 Lexington Ave. 211 Powers Bldg. P.O. Box 5614
New York, N.Y. Rochester 4, N.Y. Phila. 29, Pa.
Tel. Vanderbilt 6-1684 Tel. Baker 8701 Tel. Victor 4-8679

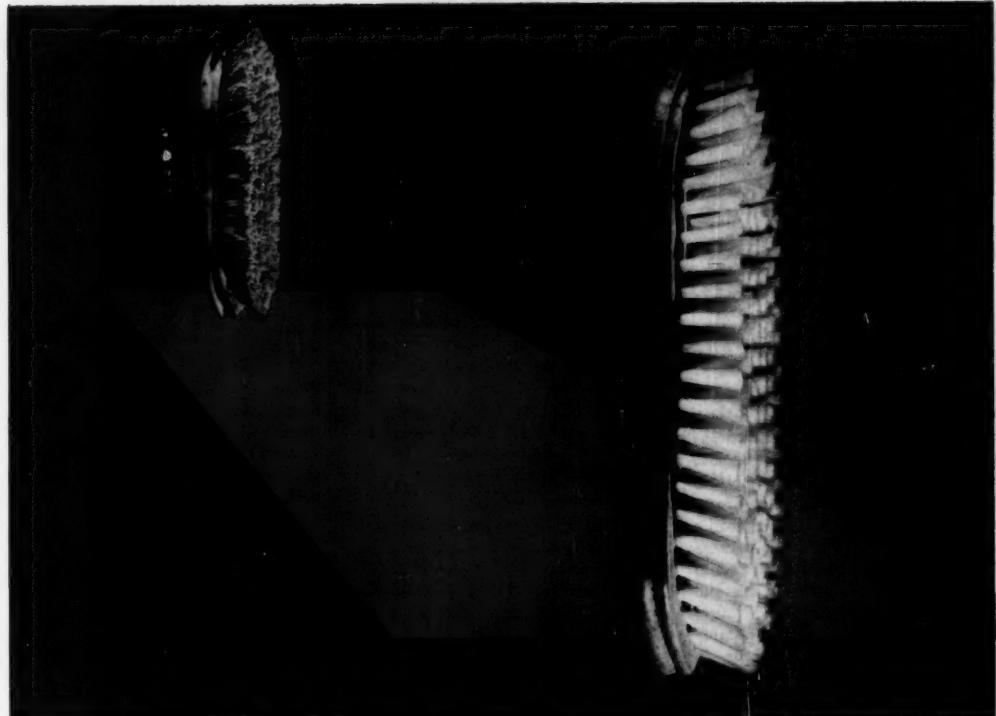


**FRENCH
HYDRAULIC
PRESSES**

... in sizes up to 1,500 tons, are standard equipment in the plastic industry.

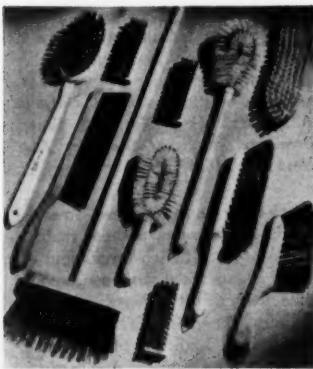
Write
for
our
catalog

THE FRENCH OIL MILL MACHINERY CO.
(HYDRAULIC PRESS DIVISION)
PIQUA, OHIO U.S.A.



You can See why housewives gladly pay more!

Compare these brushes! After 195,000 strokes in warm, soapy water, bristles on the ordinary scrub brush are matted,



BAKELITE polystyrene monofilaments are being used to make a wide variety of more colorful, useful, dependable brushes.

limp, watersoaked. The other brush is almost like new—it will outlast the old type five to one! The reason? Its bristles are made from a special polystyrene monofilament developed at BAKELITE Laboratories.

And the manufacturer, Empire Brushes, Inc., reports twice the sales, despite a slightly higher retail price—proof that housewives recognize quality in these better-looking, longer-lasting, harder-working bristles.

Brushes made with these monofilaments keep their stiffness and are easily cleaned. They wear well, resisting soaps, alcohol, and alkaline cleaning materials. Their colors won't fade. Their cost is low and they are easy to handle in production.

These superior BAKELITE polystyrene monofilaments offer an economical, fast-extruding compound with far greater toughness than earlier types and a relatively high heat-distortion

point. Woven into fabrics, rope, decorative cord and rattan, they're strong, colorful, washable. Loose, they make excellent air filters. Their good electrical properties fit them for possible use as insulation materials.

BAKELITE polystyrene monofilaments may help your product's design, production, and sales. To learn more about them, write Dept. DX-13.

BAKELITE
TRADE-MARK
STYRENE PLASTICS


BAKELITE COMPANY

A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

In Canada:
Bakelite Company (Canada) Ltd., Belleville, Ont.

BOOKS AND BOOKLETS

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery.

"Communication of Technical Information," by Robert M. Dederich.

Published in 1952 by Chemonics, Inc., 400 Madison Ave., New York 17, N.Y. 116 pages. Price \$5.00.

Attempting to correlate the interest, knowledge, and language of the technical man and the industry executive, this book offers the fundamental principles involved in the proper methods of communication between the two levels. The logical sequence for determining who is to receive information, why they are to receive it, and how it is going to be used is presented. The book stresses the thinking and logic that should underlie such communication and deals with written reports, inter-organization memos, progress statements, and oral presentations in conferences.

"Extrusion of Plastics, Rubber and Metals," by Herbert R. Simonds, Archie J. Weith, and William Schack.

Published in 1952 by Reinhold Publishing Corp., 330 West 42 St., New York, N.Y. 434 pages. Price \$10.00.

Divided into two parts, the first part of this book is devoted to the materials, methods, and equipment available for plastics extrusion. A special feature is a chapter on the design and use of extrusion dies. Also covered are the production of monofilaments, tubes, sheet, film, etc. The second part of the book is devoted to extrusion of rubber, metal, and miscellaneous materials. Photographs, diagrams, tables, charts, and a glossary of terms supplement the text.

"Selling to Industry," by Bernard Lester.

Published in 1952 by The Industrial Press, 148 Lafayette St., New York 13, N.Y. 255 pages. Price \$3.50.

Specifically covering the problems encountered in selling machinery, industrial equipment, and services, this manual presents practical ideas and suggestions to the sales engineer for improving his findings as well as

contacting, selling, and servicing customers. The book is written in the form of short articles grouped under a series of headings that cover finding the prospect; effective sales programs; selling the prospect; meeting objections; and the follow-up. Brief case histories are used as examples.

"Vinyl and Related Polymers," by Calvin E. Schildknecht.

Published in 1952 by John Wiley & Sons, Inc., 440 Fourth Ave., New York, N.Y. 723 pages. Price \$12.50.

Stressing the experimental, practical, and commercial aspects of the subject, this book surveys the family of synthetic polymers and copolymers derived from styrene, vinyl chloride, vinyl acetate, isobutylene, acrylic monomers, and many others. Illustrations, graphs, tables, formulas, more than 4000 references, and trade names for hundreds of European and American products are presented. The first chapter of the book deals with styrene polymerization and is designed as an introduction to polymer science. Other chapters include styrene copolymerization; styrene derivative and related polymers; methacrylic and acrylic ester polymers; polymers from vinyl acetate and related monomers; vinyl chloride polymers; vinylidene chloride and fluorovinyl polymers; ethylene high polymers and copolymers; sulfur-vinyl compounds; nitrogen-vinyl polymers; and vinyl ketone and miscellaneous polymers.

Laminated plastics—Laminated plastics and their applications in industry are described in this 20-page catalog. The laminates are broken down into two classifications—Insurok materials conforming to NEMA specifications and Insurok materials in special grades with exceptional characteristics. In each of these categories, the specific grades are listed with a short description as to general advantages and uses and a table covering the mechanical and

electrical properties of each. Also listed are NEMA tolerance data on laminated sheets, rods, and tubes, and information on sizes and thicknesses available. A special illustrated section offers suggestions for the proper fabricating of parts from laminated plastics, covering such operations as drilling, sawing, tapping, shearing, turning, punching, planing, shaping, and milling. The use of laminated plastics in mechanical gears and bearings, and a listing of the company's line of laminated molded plastics and special plastics materials, are included. *The Richardson Co., Melrose Park, Ill.*

Perforating of plastics—Of interest to designers, engineers, and manufacturers, this folder offers data on, as well as actual samples of, perforated plastic materials. Included are perforated swatches of plastic coated fabrics, vinyl sheet and film, resin coated paper, and rubber backed woven plastic fibers. Each is intended as an illustration of the wide selection of hole sizings, spacings, and patterns available for use in permitting the passage of air, fluids, sound, and light, as well as for decorative and industrial purposes. *The Harrington & King Perforating Co., 5655 Fillmore St., Chicago 44, Ill.*

Vinyl acetate polymers and copolymers—Vinyl acetate polymers and copolymers in solution and emulsion form are covered in this 4-page folder. Properties of five typical solutions and five typical emulsions are listed to illustrate the variations in properties obtained with polyvinyl acetate and its copolymers. Compatibility of the solutions and emulsions with modifiers; the use of plasticizers; and potential applications of resins are also discussed. Data on solution and emulsion properties are arranged in tabular form. *National Adhesives Div., National Starch Products, Inc., 270 Madison Ave., New York 16, N.Y.*

Lighting maintenance—Stressing the fact that proper planned maintenance of both light sources and reflecting surfaces will save costly time and useful light, this 12-page bulletin, "The Why, When and How of Modern Lighting Maintenance," presents a program designed for fluorescent lighting. The eight steps comprising the program are outlined

FOR A GOOD MOLDING JOB FAST-- CALL ON CONTINENTAL

Our Cambridge plant is next door to your problems

Put your plastics molding problems in the hands of Continental's engineers at our Cambridge, Ohio, plant and you'll get fast, intelligent service — the kind we're already giving many of the nation's leading manufacturers. Our central location enables us to meet delivery schedules on the button...there's no job too big for us to handle with enthusiasm and "savvy." Just tell us what you want your electrical, refrigeration, automotive or other component to do and we'll recommend the material and process that will produce it best and most economically. Why not give us a try?



CONTINENTAL CAN COMPANY

Plastics Division
CAMBRIDGE, OHIO

100 East 42nd Street
New York 17, N. Y.

Hillcrest — Route 2
Knightstown, Ind.

New Center Building
Detroit 2, Mich.

135 S. LaSalle Street
Chicago 3, Illinois

1721 NBC Building
Cleveland 14, Ohio

and described as to the benefits to be derived from each. Special emphasis is placed on planned group replacement of lamps instead of the more common and less economical "one-at-a-time" replacement. *Sylvania Electric Products, Inc., 60 Boston St., Salem, Mass.*

Monsanto plastics—Each material in the family of plastics manufactured by the company are listed in this 4-page bulletin. The products covered include: Lustrex; Cerec; Fibestos; Vuepak; Nitron; Resinox; Resimene, and Lauxite. Various applications for the plastics are illustrated and each material is accompanied by a short description of the forms in which it is supplied, its fabricating methods, and its general properties. *Monsanto Chemical Co., Plastics Div., Springfield 2, Mass.*

New monomers—Covering many which have never before appeared on the open market, this new product bulletin contains information on over 250 research and production monomers. Included in the listing are vinyl, allyl and diallyl esters of straight chain acids, alkyl acrylates and methacrylates, substituted styrenes, ethylenimines and their substituted derivatives, vinyl halides, and vinyl heterocyclics. *Monomer-Polymer, Inc., 511 Lancaster St., Leominster, Mass.*

Burundum—Designed for use in both wet and dry grinding processes, where fine dispersion or rapid size reduction is desired, Burundum, a new tubular grinding medium, is described in this 4-page bulletin. Physical properties of the material are covered and comparison data with other grinding materials are presented. The bulletin also lists the advantages, both mechanical and cost-wise, of using Burundum, and gives the results of numerous field tests. *The U. S. Stoneware Co., Mr. Stanley Craig, Akron 9, Ohio.*

Micarta aircraft pulleys—The overall characteristics of all Micarta pulleys are presented in this 7-page booklet (B-4351). The pulleys are broken down into three general types—the AN "no-glow" pulley; anti-friction bearing pulleys; and special type pulleys. Dimensioned cross-section diagrams illustrate many of the pulleys and pertinent

information is given for each class. Special applications are also covered. *Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.*

Dresinol—Revised information about the Dresinol series of resin emulsions containing 40 to 45% solids is now available in this 4-page leaflet. Physical properties of the material in both emulsion form and as dried film from emulsion are covered. Dresinol's use is suggested in laminating, heat-sealing, and wet-type adhesives; emulsion paints, coatings, and sizings; industrial fabric finishes; and binders for various types of fibrous and inorganic materials. *Paper Makers Chemical Dept., Hercules Powder Co., Wilmington, Del.*

Hard rubber and plastics handbook—Divided into six major sections, each covering a different class of materials, this handbook offers information as to properties, design and machining data, and applications for the various company products in each category. The materials covered include hard and soft rubber; pyrobitumen; resin-rubber blends; and thermoplastics. The latter chapter is devoted to the selection of the proper material to use; the various applications to which thermoplastics can be put; and bursting pressures, standard sizes, and weights as related to thermoplastics in tubing, pipe, and fittings. A table covers physical and chemical properties and general uses. *American Hard Rubber Co., 93 Worth St., New York 13, N. Y.*

Kymene—Data on Kymene, an effective strongly cationic resin for wet-strength paper, are available in this 12-page technical booklet. Included are sections on the properties of Kymene, application factors to be considered in using the resin, and properties of wet-strength papers containing Kymene. A special chapter on testing procedures covers three suggested methods for determining resin retention—total solids of Kymene solutions, wet-tensile strength and wet mullen tests, and wet-strength tests. *Paper Makers Chemical Dept., Hercules Powder Co., Wilmington, Del.*

Plaster-impregnation—Designed for use by manufacturers of cast plaster articles, a thin liquid plastic possesses

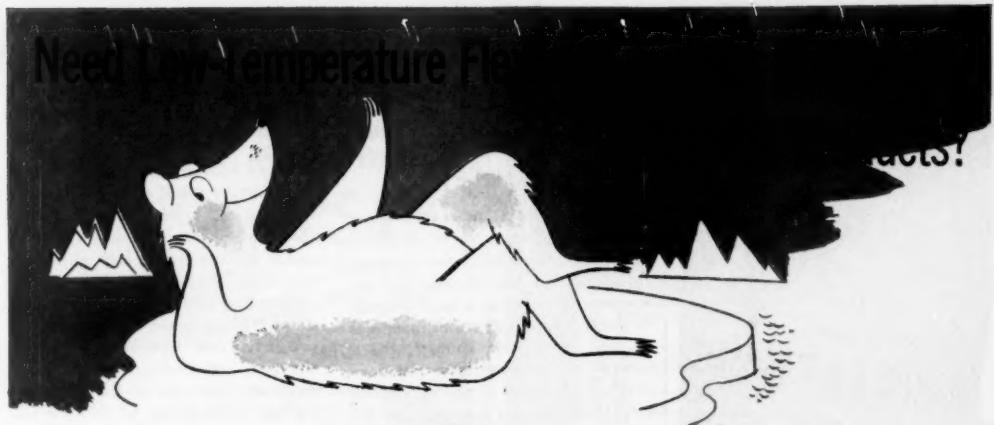
good impregnating powers and called "Plaspreg" is described in three bulletins. Information is offered on the properties of the material, its application, and comparative costs. "Calcerite-C," a new casting compound, is also described. *Furane Plastics, Inc., 719 West Broadway, Glendale 4, Calif.*

Industrial scales—Principal types of scales designed for industrial weight control purposes are described and illustrated in this 128-page catalog. Classed according to type into 17 different sections, the scales are shown in actual use and are accompanied by detailed specifications. Types covered include bench; portable; floor; counting; Printweight; and special force measuring, balancing, and testing devices. *Toledo Scale Co., Toledo 1, Ohio.*

Base color concentrates—Designed for use in the coloring of plastics resins for extrusion, calendering, and, in some cases, injection molding, a series of base color concentrates are described in this 4-page leaflet. Included also is information on the company's technical and color matching service available to the customer. *Ferro Corp., 4150 East 56 St., Cleveland 5, Ohio.*

Plywood—Ideas for the most advantageous utilization of Weldwood plywood, flush doors, striated Weldtex, and Micarta in the improving of both old and new homes are contained in this 19-page brochure, "Beautiful Wood for Beautiful Homes." Included, with full color illustrations, are suggestions for paneling, built-in bookcases, storage walls, breakfast nooks, and plywood paneled fireplaces. A special section tells how the plywood is made and gives rules and procedures to follow for most efficiently using it. The brochure is available for 10 cents from *U. S. Plywood Corp., 55 West 44 St., New York 18, N. Y.*

Industrial and decorative molding compounds—Technical data concerning the physical, chemical, and electrical properties of the company's molding compounds have been compiled in this book. Each of the cellulosic, mineral, and glass filled phenolics is listed by compound number, together with a short description as to properties, advantages, and the



TAKE A LOOK AT THESE POUR POINTS!*

FLEXOL plasticizer 4GO

Brand

(Polyethylene Glycol
Di [2-Ethylhexoate])

... An excellent low-temperature plasticizer for the vinyl chloride resins and synthetic rubbers. Rubber stocks containing 4GO have high tensile strength, high elongation, and good resilience.

FLEXOL plasticizer 3GO

Brand

(Triethylene Glycol
Di [2-Ethylhexoate])

... An outstanding plasticizer for neoprene. 3GO is also an effective processing aid in compounding perbunan types of synthetic rubber.

FLEXOL plasticizer TOF

Brand

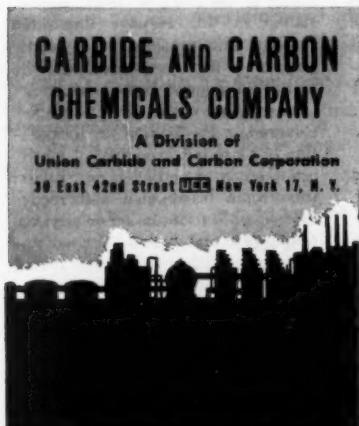
(Tri [2-Ethylhexyl] Phosphate)

-104°F.

... TOF is a recognized standard where *extra* low-temperature flexibility is required. Brittle points as low as -70°C. in vinyl compounds are common with this plasticizer. TOF combines in a single low-temperature plasticizer:

- Compatibility
- Water resistance (an excellent plasticizer for vinyl garden hose)
- Flame resistance—vinyls plasticized with TOF will not support combustion

* Temperature at which the viscosity of a plasticizer is approx. 50,000 centistokes. Low pour points are indicative of good low-temperature properties.



"Flexol" is a registered trade-mark of Union Carbide and Carbon Corporation.

Production of vinyl plastic and rubber products for military use has made low-temperature properties more important than ever before. FLEXOL plasticizers offer a range of low-temperature properties in combination with a wide choice of other basic properties. For more specific information, write on your company stationery or call any Carbide and Carbon office for our new 76-page FLEXOL Plasticizers Catalog (ask for F-5882).





all major molding methods

Our many customers find it a distinct comfort to know that Plastic Molding Corp. molds by *all five major molding methods*.

To them this means we always consider their molding assignments in terms of *what is best*, not in terms of *what equipment we have* . . . because we have every type of press equipment for molding plastics . . . the one molder in New England who offers you *all five major molding methods*.



*Molders of Plastics
for over a Quarter Century*

A.S.T.M. test methods employed to compile the data. Included also is information on preforms—how to compute the size and weight for specified molding applications; the advantages gained by their use; and their weight tolerances. *The Fiberte Corp.*, 516 West 4 St., Winona, Minn.

Abrasive belt machines—Case studies of various types of abrasive-belt machines made by the company are included in this 31-page booklet, designed to serve as a basic manual for each. The five types of machines covered are platen; contact wheel; formed wheel; centerless; and flexible belt. A series of photographs of actual applications are included for every model, with each application described as to the particular features of the machine employed to overcome the specific problems faced. *The Porter-Cable Machine Co.*, 3160 N. Salina St., Syracuse 8, N. Y.

Thermohms—Used as resistance thermometers to detect temperatures between -325° and 1000° F. with accuracies of $\pm 0.018^{\circ}$ F. to $\pm 3.0^{\circ}$ F., the entire line of these general-purpose and specialized Thermohms is described in a 36-page catalog and buyer's guide (No. EN-S4). Included for each of the Thermohms—from the copper, nickel, and laboratory platinum type to the latest industrial platinum type—are photographs, tables of specifications for easy comparison, and lists of accessories and replacement parts. A special feature of the catalog is a 5-page tabular guide indicating which of the many models available should be employed for various applications in industry. Properties of Thermohms, typical applications, and methods for installing are also described. *Leeds & Northrup Co.*, 4934 Stenton Ave., Philadelphia 44, Pa.

Patent abstract service—Designed for use by patent attorneys, research organizations, librarians, engineers, chemists, salesmen, and manufacturers, a new system for economically obtaining and efficiently maintaining patent records has been developed. Photographic copies on file cards of patent abstracts, as published in the Official Patent Gazette, are supplied to the customer on a weekly basis and only in the class, sub-class, or type of patent in which he is inter-

ested. The 4 by 6 in. cards can be furnished punched for instant sorting. Further information on the system is available from *Picturesort Co.*, 246 Church St., New Haven 10, Conn.

Silicone insulation—Listing leading manufacturers and suppliers of Class H electrical insulation components made with silicones, and Class H motor manufacturers and motor repair shops, these data sheets serve as a complete file of source of supply data. Included also is a technical property and specification sheet covering silicone-varnished glass cloth and tape, one of the most important components of silicone insulation. *Dow Corning Corp.*, Midland, Mich.

Protective plastic paint—Characteristics, applications, and methods of use of the tough, corrosion-resistant Corrosite protective plastic paint are described in this 8-page bulletin. Standing up under such adverse conditions as marine atmospheres, tropical climates, chemical attack, and abrasive action, the uses of the paint in a variety of industries are outlined. Included also are methods of applying the paint to metals, concrete, brick, stone, plaster, and asbestos board. *The Corrosite Corp.*, Chrysler Corp. Building, New York 17, N. Y.

Vinyl dispersion resins—The new formulation of Vinylite dispersion resins, plastigels, which can be processed at room temperatures with low pressures and yet retain their shape to the smallest detail, is presented in this 16-page illustrated booklet. The preparation of plastigels, their flow properties, and the gelling of organic liquids, plasticizers, and plastisols are described. Covered in the section on formulation of plastigels are effect of plasticizer; effect of gelling agent; fillers; thixotropic breakdown and recovery; effect of formulation on physical properties; and fusion. The advantages of plastigels as used in tubing and sheeting, embossing, calendering, hand modeling, potting compounds, cloth and paper coatings, and dip coatings are explained. A bibliography lists various articles on the subject. *Bakelite Co., Div. Union Carbide and Carbon Corp.*, 300 Madison Ave., New York 17, N. Y.

DUAL CROSS and ROTARY FEED

PALMGREN

Rotary, Index, Milling Table

No. 83



Now Only **54.50**

Turns Your
DRILL PRESS
into A
VERTICAL MILLER

Think what this will mean in your shop! Can be used on any Drill Press, Lathe or Milling Machine and provides what is practically a universal milling machine.

Designed for use in all types of metal and woodworking shops. A precision table permitting fine work to close tolerances. It is accurate, speedy, well constructed and attaches quickly in a firm position.

Rotary feed calibrated in degrees; Cross feed in thousandths; Dual Cross Slide with cross feed $2\frac{1}{2}$ " each side of center or $4\frac{1}{2}$ " overall. Has acme thread cross feed screws, adjustable gibs on cross slides, 40 to 1 worm and gear ratio in rotary feed. Equipped with bolt slots and locking screws.

No. 83 Table Dia. 8", T-Slots $\frac{3}{8}$ ", Base Keyway $\frac{1}{8}$ ", Base Dia. $6\frac{1}{4}$ ", Ht. 5", Wt. 37 lbs. Price Only \$54.50. Other Types available. No. 82 Dual Cross Feed only \$43.75; No. 86 Rotary Feed Only \$46.75.

Order Today! If dealer can't supply, write us. Ask for Circular No. 10

CHICAGO TOOL and ENGINEERING CO.

Mfrs. of PALMGREN PRODUCTS Since 1918

8390 South Chicago Ave. • Chicago 17, Ill.

SOLKA-FLOC in plastics

When used as a filler,
SOLKA-FLOC can contribute all
these special properties to
your plastic parts:

- Improved impact strength
- Greater dielectric strength
- More heat stability
- Lighter color
- Better wear

Find out more about the
use of this versatile prod-
uct in plastics. Write Dept.
JF-5, at Boston, for infor-
mation and samples.

SOLKA-FLOC

BROWN



COMPANY, Berlin, New Hampshire

CORPORATION, La Tuque, Quebec

General Sales Offices: 150 Causeway Street, Boston 14, Mass.
Dominion Square Building, Montreal, Quebec

SOLKA & CELLATE PULPS • SOLKA-FLOC • NIBROC PAPERS • NIBROC TOWELS • NIBROC
KOTOWELS • HERMICO SEWER PIPE, CONDUIT & CORES • ONCO INSOLES • CHEMICALS

"dag"

Concentrated
Dispersions of
Carbon Black

... for coloring polystyrene, poly-
ethylene, ethyl cellulose, cellulose
acetate, the vinyls and a variety
of plasticizers.

Produced either in granular form
or as readily extendible pastes,
Acheson Concentrated Carbon
Black Dispersions yield surfaces
possessing high lustre and jetness
without the use of toners... using
in some cases as little as one-fifth
of the ordinary colorant.

Acheson Blacks are literally dustless
will reduce processing time
and cost.

You may now enjoy the combined
Acheson Colloids and Pacific
Companies in the production of
superior granulations or pastes.
Acheson Blacks are
dustless, printing ink
grade, pharmaceutical grade
and food grade. Acheson
Acheson Blacks are
in demand for the dispersing of
organic colorants to specification
in one of our specialties.

Acheson
Colloids Corporation

dag
DISPERSIONS

COTTON FABRICS

FOR
COATING
AND
LAMINATING

J.H. LANE & CO., Inc.

250 W. 57th St. • New York, N. Y.

Quality
GET What you PAY for
with TRU-CAST Beryllium
Copper castings



Shoe SHINE-O-MAT. Molds by Wess Plastic Molds, L.I., New York, using TRUCASTINGS—Of Course!

Our stock of raw material has **ALWAYS** been ample to fabricate your every requirement.

Write for our **NEW** Brochure



MANCO PRODUCTS INC.

2401 Schaefer Road
Melvindale, Michigan

Production of

FOR the purpose of this report, production is the sum of the quantities of materials produced for consumption in the producing plant for transfer to other plants

PLASTICS AND SYNTHETIC RESIN PRODUCTION
From Statistics Compiled

Materials	Total p'd'n. 1951	Total sales 1951
CELLULOSE PLASTICS: ^a		
Cellulose acetate and mixed ester plastics:		
Sheets, under 0.003 gage	16,371,573	15,149,076
0.003 gage and over	10,712,805	10,395,182
All other sheets, rods and tubes	5,777,825	5,174,687
Molding, extrusion materials	64,554,020	62,209,681
NITROCELLULOSE:		
Sheets	6,508,739	5,563,118
Rods and tubes	1,102,347	1,225,222
Other cellulose plastics ^b	11,951,895	10,714,003
PHENOLIC AND OTHER TAR ACID RESINS:		
Laminating	76,803,262	49,790,117
Adhesive	42,845,307	39,578,128
Molding and casting materials ^c	238,249,683	205,712,114
Protective coatings (unmodified and modified except by rosin)	29,754,324	23,281,175
Miscellaneous uses	75,909,913	71,676,158
UREA AND MELAMINE RESINS:		
Adhesives	78,129,315	76,219,674
Textile-treating resins	27,787,221	26,361,541
Paper-treating resins	18,232,071	17,552,570
Protective coatings, modified and unmodified	24,944,684	18,205,271
Miscellaneous uses, including laminating and molding ^d	79,710,255	73,862,632
STYRENE RESINS:		
Molding materials ^e	270,156,933	246,405,650
Protective coatings, modified and unmodified	46,027,409	43,253,744
Miscellaneous uses	58,942,726	50,828,493
VINYL RESINS: ^f Total		
Sheeting and film (resin content) ^g	463,120,217	398,906,760
Adhesives (resin content)		161,580,852
Textile and paper-treating resins (resin content) ^h		13,274,638
Molding and extrusion materials (resin content)		43,688,524
Protective coatings (resin content)		134,891,045
Miscellaneous uses (resin content)		21,742,621
		23,729,080
COUMARONE-INDENE AND PETROLEUM POLYMER RESINS:		
	171,439,168	169,820,209
MISCELLANEOUS SYNTHETIC PLASTICS AND RESIN MATERIALS:		
Molding materials ⁱ	82,506,818	72,158,479
Protective coatings ^j	19,156,981	21,162,828
All other uses ^k	99,726,351	94,554,260

^a Dry basis unless otherwise specified. ^b Revised. ^c Includes fillers, plasticizers, and extenders. ^d Includes sheets, rods, and tubes, and molding and extrusion materials. ^e Based on resins for laminating and miscellaneous uses as a dry basis. ^f Data on resin content are not available for the base period. ^g Production statistics by uses are not representative, as end-use may not be known at the time of manufacture. Therefore, only statistics on total produc-

Plastics Materials

of the same company, and for sale. Sales include only the quantities involved in bona fida sales in which title passes to the purchaser.

IN POUNDS* FOR DECEMBER, 1951, AND JANUARY, 1952
by U. S. Tariff Commission

December 1951		January 1952	
Production	Sales	Production	Sales
1,507,128	872,332	1,733,512	1,170,774
560,304	414,930	668,300	641,591
458,262	300,909	555,249	445,542
2,894,498	2,721,847	4,242,693	3,940,962
406,527	347,083	459,309	410,699
60,277	90,834	61,986	87,877
507,069	382,498	734,155	621,683
4,897,856	2,850,481	5,236,223	3,373,866
2,481,360	2,520,421	4,382,368	3,525,991
17,000,161	12,551,313	18,176,546	13,789,567
1,939,734	1,698,097	2,858,122	2,115,343
4,591,103	3,975,345	5,564,202	4,905,027
4,916,760	5,081,821	4,654,131	5,016,375
2,955,605	3,058,136	3,237,336	3,043,563
1,340,077	1,624,776	1,814,794	1,682,623
1,600,562	1,094,837	1,654,283	1,382,654
3,748,480	3,319,550	5,102,276	4,739,664
21,405,003	14,295,434	21,753,357	15,121,314
4,209,763	3,470,638	4,277,624	4,734,760
5,061,982	4,610,443	5,641,762	4,454,139
42,028,641	27,242,945	43,445,684	33,346,630
	11,096,994		13,124,744
	713,649		1,121,870
	2,597,199		3,030,523
	9,402,658		11,771,864
	1,464,835		1,521,934
	1,967,610		2,775,695
13,868,920	12,890,692	13,929,571	13,717,987

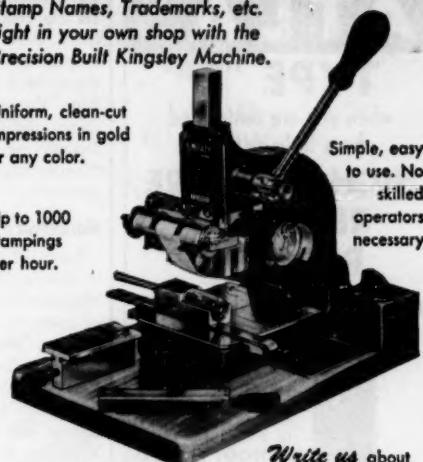
tion are given. * Prior to January 1951, statistics were given on the basis of total weight. ¹ Includes data for spreader and calendering-type resins. ² Includes data for acrylic, polyethylene, nylon, and others. ³ Includes data for epichlorohydrin, acrylic, polyester, silicone, and other protective coating resins. ⁴ Includes data for acrylic, resin modifications, nylon, silicone, and other plastics and resins for miscellaneous uses.

PLASTIC MARKING

Stamp Names, Trademarks, etc.
right in your own shop with the
Precision Built Kingsley Machine.

Uniform, clean-cut
impressions in gold
or any color.

Up to 1000
stampings
per hour.



Simple, easy
to use. No
skilled
operators
necessary

Write us about
your marking requirements. Enclose a sample or di-
mensions of part to be stamped. We'll reply air mail
with complete details on how a Kingsley Machine can
be applied to your specific need.

Kingsley STAMPING MACHINE CO.
HOLLYWOOD 28 CALIFORNIA

VINYL PLASTISOLS

FOR ALL PURPOSES

*Tailor-made to fit your
requirements.*

*We maintain a fully
equipped laboratory
and free consulting
service.*

RUBBER CORP. OF AMERICA

274 Ten Eyck Street Brooklyn 6, N. Y.
111 West Monroe Street Chicago 3, Ill.

Sales Representatives:

Ernest Jacoby & Co., 79 Milk St., Boston 9,
Mass.

Charles Larkin II, 250 Delaware Ave., Buffalo 2,
N. Y.

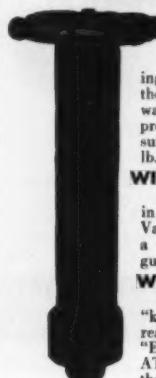
SPECIFY

ATLAS

TYPE "E"

when you are confronted
by a truly difficult

**HIGH PRESSURE
REDUCING
PROBLEM**



Type "E", shown at the left, is used in all of the leading plastics plants of the world. It handles water pressure, oil pressure, or air pressure, as high as 6,000 lb. per sq. in.

WITHOUT SHOCK
Every Type "E"—in fact every ATLAS Valve—is backed by a positive ATLAS guarantee.

WORKMANSHIP

Workmanship and "know how" are the reasons why Type "E" is so dependable. ATLAS has been in the regulating valve business exclusively for more than a half century. Result: the valve body of Type "E", for instance, is made of the strongest forged steel. The main valve and the seat ring, subject to severest abrasion and corrosion, are STELLITED. Other internal parts are of hard chromium plated stainless steel. A formed packing of special material superior to leather is used which is immune to all fluids commonly used in hydraulic machinery. The pressure on the seat is balanced by a piston with the result that variations in high initial pressure have little effect on the reduced pressure. And so on.

Ask for complete data. Use the coupon below and save time. Also you may be interested in other ATLAS plastics plant equipment, listed below.

ATLAS VALVE COMPANY
REGULATING VALVES FOR EVERY SERVICE

277 South St., Newark 5, N. J.

Represented in Principal Cities

Please send complete information on the ATLAS Type "E" Reducing Valve. Also please send information on the following ATLAS Plastics Plant products—

<input type="checkbox"/> Damper Regulators	<input type="checkbox"/> Pump Governors
<input type="checkbox"/> Temperature Regulators	<input type="checkbox"/> Oil Control Cocks
<input type="checkbox"/> Reducing Valves	<input type="checkbox"/> Humidity Controllers
<input type="checkbox"/> Exhaust Control Systems	<input type="checkbox"/> Thermostats
<input type="checkbox"/> CAMPBELL Boiler Feed Water Regulators	<input type="checkbox"/> Balanced Valves
	<input type="checkbox"/> Control Valves

Name _____

Firm _____

Street _____

City _____ State _____

Fifth National S.P.I. Conference

MANAGEMENT, marketing, industrial relations, and technical problems were featured in the 1952 Annual Conference of the Society of the Plastics Industry, Inc. Professors from the Wharton School of Finance and Commerce, University of Pennsylvania, and plastics industry representatives were the feature speakers.

Marketing's Contribution

Lead-off speaker was Dr. Robert P. Brecht, President, National Office Management Assoc., and Professor of Industry, Wharton School, on the subject, "Modern Management Techniques." The subject of Dr. Reavis Cox, Director of Research Projects for Retail Credit Institute of Marketing and Professor of Marketing, Wharton School, was "Marketing's Contribution to the Value of a Product." Dr. Cox stated that of each dollar the consumer spends, about 50¢ goes to production and 50¢ to marketing. Involved are transportation, storage, traffic planning, advertising, promotion, and selling. Goods, states Dr. Cox, are not really produced at the time when they leave the farm, the mine, or the factory. They are produced rather only when they have finally reached the ultimate consumer.

Mobilization Peak

"What Will Follow the Mobilization Build-up?" was the subject of Dr. Charles R. Whittlesey, Chairman, Dept. of Finance, Wharton School. Key point of his address was that the mobilization peak, when it comes, will look more like a hump than a pinnacle, and the point of maximum build-up will be reached at different times for different industries—which will help to ease the transition to a lower level of military spending. Since in current discussions of the economic outlook, Government spending for military purposes has been given more weight than it deserves, we must chiefly watch spending by consumers, and that, at present, is potentially unstable and destabilizing. This instability of consumption will play a decisive role in the critical months and years ahead, with shifts in public opinion, as from war scare to deflation scare, acting as the determining factor in decid-

ing in just which direction this potentiality would be most apt to exert itself.

Defense Spending

Dr. George W. Taylor, Professor of Industry, Wharton School, and former chairman, Wage Stabilization Board, spoke on "Industrial Relations in a Defense Economy," with particular reference to inflationary trends created by defense spending. Tax programs, expansion of Government expenditure, credit control, and other actions are available to compensate for imbalance between purchasing power and supply of civilian goods in a defense economy, and wage stabilization rules will play their part. Dr. Taylor recommended that provision for a productivity factor be worked into wage stabilization rules, especially if the defense effort is to be protected.

Executive Manpower

"Personnel Development" was the subject of Dr. John R. Abersold, Professor of Industrial Relations and Personnel Administration, Wharton School. He concentrated on executive manpower development. Modern business, more involved and complex than ever before, requires a correspondingly higher order on the administrative scale. Government relations, labor problems, taxes, and the very size and pace of business, have brought about the necessity for trained and "developed" executives. For some time the trend in vice-presidential development was toward specialization, and then it was found that few men had the scope of knowledge and ability to be able to take the top job. Therefore, business must develop men capable of handling special operations and yet still ready for broader responsibilities.

Sales Responsibility

William Crean, Lacey Sales Institute, spoke on "What Makes a Star Salesman Tick?" He outlined the major classifications necessary to top sales effort, and showed management's responsibility in the matter.

Airless Blast

First of the technical papers was by LeRoy S. Wieschhaus, American (Continued on p. 158)



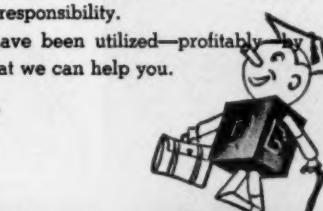
IF YOUR PROBLEM IS PLASTICS...

Call Cubee

When you are face to face with a problem involving plastics, call Cubee. We are sure that our wide experience gained in serving many different industries can help you. We offer all services necessary to the solution of your problem—from designing the part, making the die to producing the finished job. All of these services are here—under one roof. There is no "farming out" of responsibility.

For several years our services and production facilities have been utilized—profitably by a wide variety of customers. We feel sure that we can help you.

QUINN-BERRY CORP.
2651 West 12th Street
ERIE, PENNSYLVANIA



Branch Offices:

MR. HARRY R. BRETHEN
15 Lawrence
Detroit 2, Michigan
Phone — Townsend 8-2577

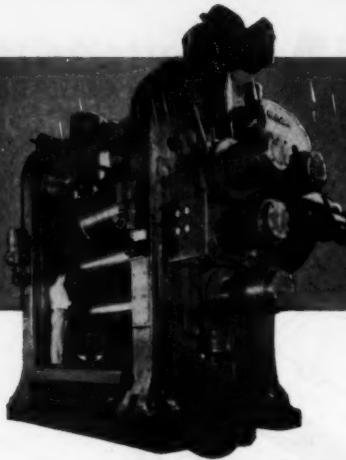
MR. JOHN WEILAND, JR.
7105 Grand Parkway
Milwaukee 13, Wisconsin
Phone — Greenfield 6-7161

MR. H. B. COLLINS, JR.
Fairport Road
East Rochester, New York
Phone — Hillside 2415-M

MR. AUSTIN L. WRIGHT
24 Decatur Road
Haverstown, Penna.
Phone — Hilltop 7-0345

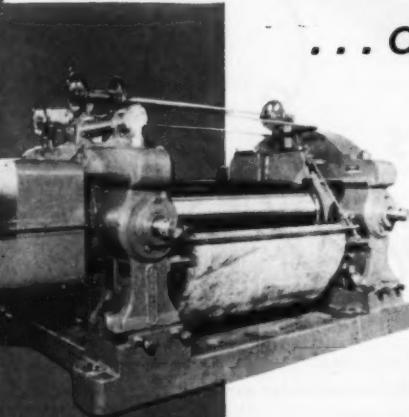
CALINDERS

We make all types and sizes of Calenders, precision designed for extremely close tolerances to meet the most exacting requirements in the production of plastic film or the coating of fabrics with rubber or plastics. The unit shown is an ADAMSON UNITED 5.7" x 92", 4-Roll Plastic Calender geared to produce 7/8" wide vinyl film, 2 mils. or less in thickness at speeds to 150 YPM.



RUBBER and PLASTICS -

... designed and built by...



MILLS

An 8" individual Mill equipped with a mixing paddle. ADAMSON UNITED Mills may be had in all sizes from 6" x 16" to 28" x 84", driven individually in pairs with right angle reducer between the units, or grouped on a line shaft with reducer at one end of the shaft. Apron, as shown, can be installed on any type of existing mill. New catalog No. 465 on request.

AUTOCLAVES

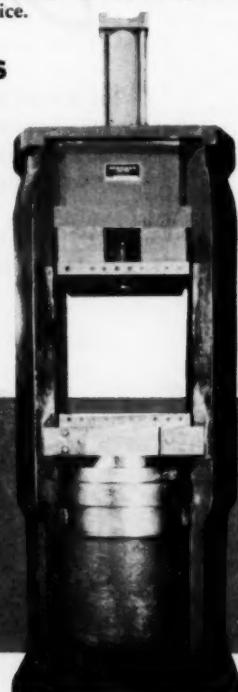
or
VULCANIZERS



We engineer and build all types of individual production units and complete electronically controlled trains with all accessories for every Rubber or Plastics processing requirement. Our highly specialized engineering and production facilities plus the combined research and technical abilities of United Engineering and Foundry Company, and the manufacturing capacity of eight modern plants, are at your service.

PRESSES

We build all types of presses for the rubber, plastics and plywood industries. Shown is a new 24" ADAMSON UNITED BARREL TYPE PRESS with transfer cylinder. This new press, an exclusive ADAMSON UNITED development, exerts up to 76% more platen pressure than conventional types without change in present hydraulic lines. Stock is transferred into the mold cavities through sprues which reduces cure time and flash trimming to a minimum. Sizes range from 12" through 32" with larger sizes available to specification. Presses Catalog No. 462 on request.



Built to specific requirements from 18 inches to 15 feet in diameter, say length, vertical or horizontal to withstand internal pressures as high as 1000 lbs. per-square-inch. The Pot Heater shown is a vertical cylinder-operated

Write for Vulcanizer Catalog No. 461.



COOLING DRUMS
and TURRET-TYPE WINDUPS

This is a photograph of a complete line of automatic tire winding equipment. It includes cooling drums, compensation shafts and automatic tire winding. The tire winding stand is a counter-clockwise winding automatic indexing equipment, carding counter, and adjustable tension control. We design and build complete calendering process systems including oil recovery equipment.

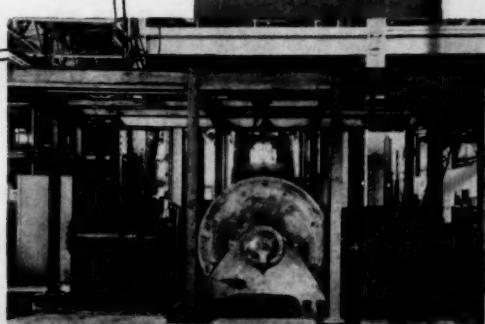
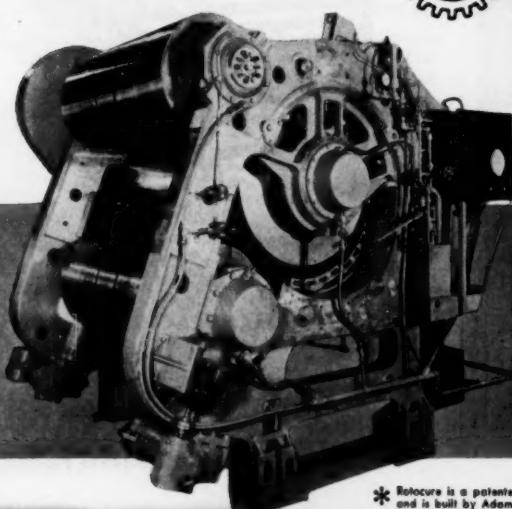
PRODUCTION UNITS

..... ADAMSON UNITED

Wire, phone or write us today. No obligation.

ADAMSON UNITED COMPANY
730 CARROL STREET • AKRON 4, OHIO

SALES OFFICES IN PRINCIPAL CITIES
Subsidiary of United Engineering
and Foundry Company



ROTOCURE

A new machine for the continuous curing of all kinds of rubber or plastic articles with smooth or finished surfaces. Rotocure increases production through continuous processes without opening, cooling, re-heating and cooling. It eliminates overcuring and narrowing of the over-lap areas occurring on conventional presses. Roll and belt changes, loadings and unloading can be made in a matter of seconds.

* Rotocure is a patented development of Boston Woven Hose and Rubber Co. and is built by Adamson United Co. under a licensing arrangement.

Wheelabrator & Equipment Corp., who discussed the use of airless blast equipment in the deflashing of thermosetting plastics. In this process, molded parts are bombarded with millions of tiny pellets, which seek out the flash and break it off by impact. The pellets used are made of crushed apricot pits, pecan shells, and other non-abrasive materials.

The New Styrenes

Frazier Groff, Ass't Director of Development, Bakelite Co., spoke on "Styrene Compounds as New Tools for Industry," discussing the new copolymers and modifications of styrene which are beginning to open up new markets for styrene plastics.

Mr. Groff described a copolymer of styrene and acrylonitrile which has better chemical resistance and will stand exposure to weather better than standard polystyrene materials. The material is intermediate between regular polystyrene and the high impact types in toughness.

Mr. Groff also mentioned a polystyrene of controlled polymer distribution which is especially suitable for making monofilaments, including brush bristles. Among the possible

commercial applications of this material are rope and decorative cords, woven fly screening, special fabrics, rattans, and air filters.

Metals on Plastics

"The High Vacuum Metallization of Plastics" was discussed by Alvin H. Hartman, Sales Mgr., Vacuum Equipment Dept., Distillation Products Industries. The process is one for applying to a plastic or other nonporous base material a coating which is abrasive-resistant, non-tarnishing, and pleasing to the eye, through a discriminate combination of lacquer and a thin film of evaporated metal applied under high vacuum. Mr. Hartman showed that there are few limitations to the successful use of high vacuum metallization in decorating plastics, and that modern equipment now provides an integrated low-cost process.

New Horizons

Wilton A. Hawkins, E. I. du Pont de Nemours & Co., Inc., discussed "Techniques Used in the Fabrication of Polytetrafluoroethylene Resins." D. Lorin Schoene, Naugatuck Chemical Div., U. S. Rubber Co., spoke on

"New Horizons in Rigid Thermoplastics," discussing the properties of one of a series of resin-rubber blends which is finding increasing use for both molding and extrusion, and a new blend of the same general type which retains physical properties down to temperatures of -60° F.

The materials Mr. Schoene described are styrene-acrylonitrile resins modified with butadiene-acrylonitrile rubber. These blends can be tailored to meet various requirements by careful control of the composition of both resin and rubber, and by mixing in proper proportions. Mr. Schoene discussed the methods of molding and extruding the materials and the physical characteristics of the finished parts.

He pointed out that intricate moldings can be made of the material using pin-point gating, despite the fact that large gates and runners were once thought to be necessary. Cylinder temperatures should be somewhat higher than for polystyrene. Temperatures of 375 to 600° F. are recommended. However, pressures and cylinder temperatures must be balanced to obtain the desired properties. Excessive pressure

PRECISION
PRECISION
PRECISION
PRECISION
COMPRESSION & INJECTION
PLASTIC MOLDS

Whether it's plastic dishes, electrical devices, buttons or heavier work—there's a Butondex precision engineered mold to do your job! And you get consistently superior service—because they last longer... because they're better made of finer materials... in short, because they're precision engineered!

And because we're fully equipped for molds, cavities and tools we can fill your specific needs—can prove to you that—

"YOUR PROBLEM IS OUR PRODUCT!"

For additional information write:

Butondex
CORP NEW YORK 16, NEW YORK



For all light materials requiring accuracy and top production performance. In 30" to 60" sizes.
Write for illustrated folder.



HOBBS MANUFACTURING CO.

EST. 1882
25 Salisbury St. Worcester 5, Mass.

manufacturers of:
JACQUES Hand and Power Shears,
TRI-POWER Die Presses, Paper Box Machinery, and
TOUCH-O-MATIC Paper Cutters.

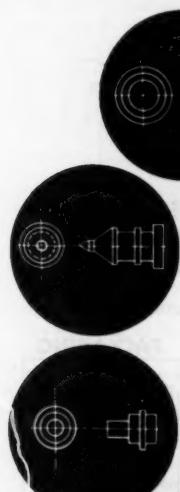


Write today for Illustrated Catalog!

APEX MACHINE MFG. CORP.

Largest and Oldest Mfrs. of Multi-Color Ink
and Hot Stamping Machines

53 East 10th St. • New York 3, N. Y.
GRAMERCY 5-4502



form grinding

FAST • ECONOMICAL

Low tool and running cost with accuracy to $\pm .002$ on non-metallic cylindrical turnings makes Form Grinding the answer to many of today's production—capacity problems.

Range of size is from $\frac{1}{8}$ " to $\frac{3}{4}$ " in diameter up to 7" long.

SEND A PRINT OR SAMPLE OF
YOUR PART FOR QUOTATION...

nylon
fiber
acetate
bakelite
cork
wood

ORANGE PRODUCTS, INC., 82 MAIN ST. • WEST ORANGE, N. J.

HARFLEX* PLASTICIZERS

THE NATURAL BRIDGE *BETWEEN*

VINYL RESINS
RUBBERS
CELLULOSE ESTERS

OUTSTANDING
CONSUMER
PRODUCTS

Send for our new catalog

MANUFACTURERS OF SEBACIC ACID

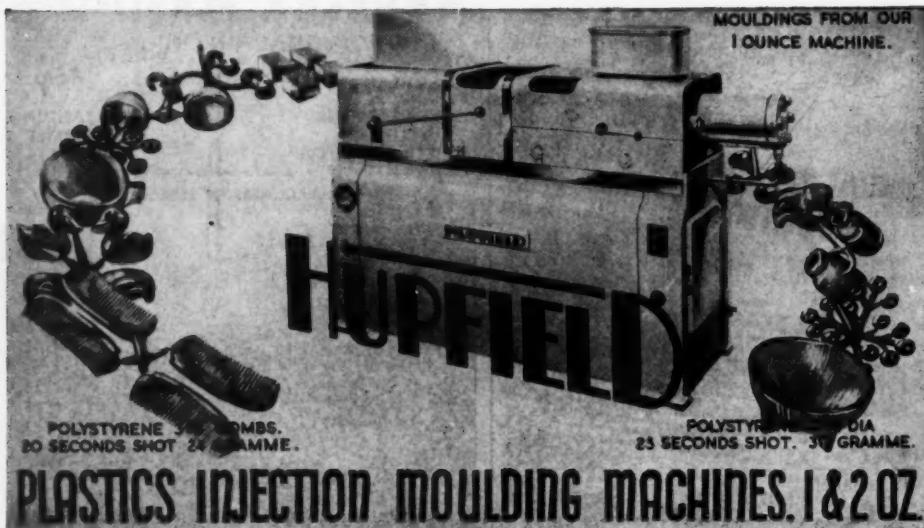


Natural Bridge—Virginia

THE KEY TO
HARDESTY *CH*ARCHEM®
CHEMICAL COMPANY INC. BETTER PLASTICS

41 EAST 42nd ST., NEW YORK 17, N. Y.

Canadian Distributor: W. C. Hardesty Co. of Canada Ltd.,
975 Lakeshore Road, New Toronto, Canada



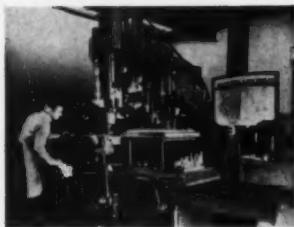
These hydraulic semi-automatic machines are extremely powerful and have a high rate of production. They are specially designed for unskilled female labour. Operated by one lever only and the patent toggle action reduces the maximum pressure to an extremely light to operate. Both machines are fully enclosed including water cooling for the tank and both halves of the moulds. Heat thermostatically controlled to plus or minus $\frac{1}{2}^{\circ}$.

SHOT CAPACITY	1 OUNCE	2 OUNCE	1 OUNCE	2 OUNCE
Moulding Area	12 sq. ins.	22 sq. ins.	Heating Unit	
Plasticizing Capacity per Hour	9 lbs.	18 lbs.	Consumption	1000 Watts
Injection Pressure	5½ tons	11 tons	Motor, Electric	3 H.P.
Mould Locking Pressure	22 tons	44 tons	Hydraulic Pump	Vickers V.105-A
Mould Opening	4½"	7"	Size of Base	Pesco 3HSBCX
			Shipping Weight	4'8" x 1'10"
				5'8" x 1'10"
				18 cwt.
				27 cwt.

Sole Agents:—PLANT INSTALLATIONS LTD., POST OFFICE CHAMBERS, CHURCH ROAD, STANMORE, MIDDLESEX, ENGLAND

PLASTIC MOLDS

NEW QUARTERS • ADDED FACILITIES



Our new modern plant and added facilities are now at your disposal to satisfy all your plastics mold requirements. We supply complete engineering coverage on injection, compression, transfer, plunger, and low pressure polyesther applications.



nordan
LARGEST
FINISHING PLANT
IN THE EAST

for faster, more economical service

FINISHING ASSEMBLING PACKAGING



Send for handsome brochure describing the Nordan facilities, or have our technical representative show how Nordan cuts your costs.

nordan plastics corp.

the complete finishing plant

99 Richardson Street Brooklyn 11, N. Y.
EVergreen 8-9052 - 9072

Modern Plastics

sets up undesirable stresses in the pieces; excessive cylinder temperature lowers impact strength.

Financial Survey

At a luncheon meeting of molders, Donald L. Gibb, manager of Plastics Sales, Dow Chemical Co., and Robert B. Bennett, assistant secretary of Dow, presented a preview of a survey of financial reports of plastic industry companies, compiled by Edward V. Tarnell of Tarnell Co. Inc., and designed to serve as a yardstick for the management of molding companies. The full report is to be made available to the industry shortly.

Elections of the new officers of Society of the Plastics Industry will be conducted by mail and reported in a later issue.

Canadian S.P.I. Conference

FAIR attendance was noted at the 10th Annual Conference of the Society of the Plastics Industry (Canadian) Inc., which was held at the Royal York Hotel, Toronto, Ont.

General Chairman of the conference was F. Perry Wilson of Bakelite Co. (Canada) Ltd. Chairman of the opening session was A. E. Byrne, head of the Plastics Div. of Canadian General Electric Co. Ltd., who introduced Howard Yates, president of the Canadian S.P.I.

Resources and Development

First speaker was Dr. H. H. Saunderson, deputy director, Chemicals and Explosives Div., Dept. of National Defense, who spoke on "Canada's Resources and Prospective Development as Related to the Plastics Industry." Dr. Saunderson outlined a post-war expansion of the chemical industry and the related plastics industry in Canada, and discussed the potentialities which are inherent in new discoveries in materials in the tar sands of northern Alberta, the natural gas and petroleum fields, and the mining industry.

Materials Makers' Problems

Gordon Brown, president, S.P.I. Inc., and vice-president, Bakelite Corp., took the subject, "Let the Past Portend the Future." He reviewed briefly the early growth and early

**TURN ON
THE BLUE LIGHT**

**THE MAN WANTS
BLUE PLASTIC!**

**IT'S ALMOST AS SIMPLE AS
THAT—AND WITH**

UNICOLOR

YOU SAVE MONEY TOO—

The simple truth is that UNICOLOR saves as much as $5\frac{1}{2}$ ¢ per pound. It reduces inventory losses and costs. Also eliminates production delays while increasing equipment capacity.

UNICOLOR requires no skilled mixing hands, nor special mixing equipment. Coloring and extrusion is simultaneous without worry as to color uniformity and product regularity.

UNICOLOR is perfectly matched to meet your customer's most exacting requirements. UNICOLOR also comes in a wide variety of NEMA approved scientifically matched colors.

Write us about your problems and send for additional information on how to cut costs and increase the sales appeal of your plastic products.



WESTCHESTER
PLASTICS, INC.

326 Waverly Avenue, Mamaroneck, New York
Custom Compounders of Thermoplastic Materials



Where Cost is a factor . . .



. . . Nacromer is the perfect substitute for Pearl Essence, providing a brilliance almost equal at considerably lower cost.

Nacromer is stable, inert, non-corrosive, and will provide a permanent lustre to plastic when incorporated into the plastic on the rolls or in the Banbury. Any desired color may be obtained by the addition of aniline dyes and critical metals now in short supply may be simulated. Write for technical data bulletin and generous working sample.

THE MEARL CORPORATION

153 Waverly Place

New York, N. Y.

World's largest producer of Natural Pearl Essence



PHENOPREG MATERIALS

for LAMINATING and MOLDING
high pressure • low pressure

IMPREGNATED MATERIALS for LOW PRESSURE APPLICATIONS

PHENOPREG materials, which include resin impregnated fabrics, papers, glass cloth and glass mat, are available for laminating and molding at pressures ranging from contact to 250 psi.

These products have found wide acceptance for molded helmets of various types, aircraft drill jigs, fixtures and structural parts, as well as many other applications.

We will develop impregnated materials to meet specific Government specifications or special industrial applications upon request. Die cut preforms are available if desired.

FABRICON PRODUCTS, INC.
PLASTICS DIVISION

Main Office 1721 Pleasant Ave. • River Rouge 18, Mich. • Vinewood 1-8200
Manufacturing Plants: River Rouge, Los Angeles • Sales Offices: New York, Chicago
Canadian Representative: Plastic Supply Company, Montreal, Toronto

problems of the materials makers in relation to molders, and showed that while the chemical industry has always been forced to make long term purchase contracts for supplies of raw materials, and long term major investments for the production of raw materials, the molding industry has never had to make such long term commitments. By more intensive selling of greater volume (which lowered prices), by encouraging the invasion of new fields of application by plastics, and by service to customers, the material makers were able to earn profits and obtain capital for expansion which, in the case of thermoplastics alone, went from 10 million lb. a year in 1930 to almost a billion lb. in 1951. Mr. Brown predicted that the curve of production will continue to go up although expansion rate won't be maintained.

The industry will continue to grow. But with tax laws which prohibit the accumulation of surplus with which to gamble, plastics manufacturers will proceed more cautiously in the future. Many opportunities in the future will present themselves only to those who can assemble important capital. Materials makers will no longer be in a position of having an accumulated reserve which might be used to bolster or salvage customers. Each manufacturer, molder, and fabricator will have to do all he can to maintain his own finances, to maintain a good credit record, to plan and schedule both sales and production, to manufacture only products for which he will be responsible, and to sell at prices permitting these things.

Problems of the Arctic

"Conditions in the Arctic as They Affect Troops and Equipment" were discussed by Lt. Col. H. A. Delcellier, Director of Inter-Service Development (Clothing and Equipment), Dept. of National Defense. Pointing out that global concepts of war require new evaluations of equipment, clothing, missiles, and vehicles, in areas in which the mean temperature is below freezing, and in which severe electrical storms constantly reduce the efficiency of electrical means of communication, Col. Delcellier outlined the work of Canadian Dept. of National Defense in developing such equipment.

At the luncheon meeting, under the chairmanship of Mr. Yates, E. G.

DAVIS-STANDARD EXTRUDERS



Davis-Standard 3 1/4" Thermoplastic Extruder

...BUILT BY MEN WHO KNOW PRODUCTION PROBLEMS

When you buy a Davis-Standard extruding machine for rubber or plastics, you are also buying long and intimate experience in solving production problems. This saves you time and trouble, for the machine will perform dependably in long service.

Continuous production at a high rate is greatly facilitated by the exclusive Davis-Standard "Stream-Flo" insulating head. Exclusive with our thermoplastic models is our "Therma-Fin"** heating jacket, with tubular heating elements and stainless steel cooling coils, cast into aluminum cooling fins. This construction permits any desired temperature condition to be obtained.

Other features include sectional-type cast steel cylinders, affording precise temperature control. Each section has wear and corrosion-resistant liners. Stock screws are of special steel alloy, with variations available for different compounds. Feed section is a separate casting, with improved-type undercut throat.

Davis-Standard extruders are furnished complete with control panel and all necessary accessory equipment, ready for installation and operation.

Tell us your problems and requirements in extrusion equipment. Our engineers will cooperate with yours to solve your production problems.

*Patent Pending



THE STANDARD MACHINERY COMPANY

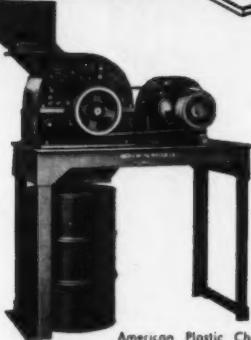
Established 1842

MOLDING PRESSES AND EXTRUSION MACHINES
WORLD'S LARGEST MANUFACTURERS OF CUSTOM-BUILT EXTRUSION MACHINES

8 WATER STREET, MYSTIC, CONNECTICUT
Export Office: Ballagh & Thrall, Independence Square, Philadelphia 6, Pa.

PLASTIC MANUFACTURER REDUCES 200,000 LBS. OF PLASTIC SCRAP YEARLY

with this



AMERICAN ROTARY KNIFE PLASTIC CHOPPER

IN USE EVERY DAY . . .
6 DAYS A WEEK!

In the past year, this American KC-9 Rotary Knife Plastic Chopper, installed at a large St. Louis plastic molding company, has reduced over 200,000 pounds of plastic scrap to an homogenous granulation . . . at a rate of up to 1500 lbs. per day. (Short scrap is being run through at an average of 300 lbs. per hour.)

American Plastic Choppers—available in two sizes, 9x9 and 9x12—are built for the heavy-duty demands of constant, tough usage. Size, shape, or kind of plastic is no problem for this sturdy machine. The clean, shearing action of the adjustable rotary cutter blades of fine tool steel, provide fast, once-through reduction.

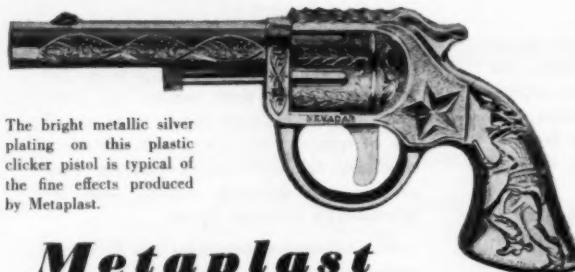
Write for your copy of
"GRINDING PLASTIC SCRAP PROFITABLY"

American

Originators and Manufacturers of
Ring Crushers and Pulverizers

PULVERIZER COMPANY

1117 Macklind Ave.
St. Louis 10, Mo.



The bright metallic silver plating on this plastic clicker pistol is typical of the fine effects produced by Metaplast.

Metaplast
makes plastics gleam . . . and
when plastics gleam—they sell!



Fast delivery • quality work

Outstanding metallic effects mass-produced at lowest cost by the industry's foremost pioneer. Metaplast metalizes on plastics, metal, glass by all methods of coating. Consult us on your problems.

Factory and office:

34-51 56th St.,
Woodside, L. I. 77, New York
Phone: HAvenmeyer 6-9843

Salmond, publisher of Canadian Plastics magazine, presented the achievement awards in that publication's annual competition.

Design Factors

H. A. Gadd, of Canadian General Electric Co. Ltd., was chairman of a session at which the first speaker was Michael A. Brown Jr., manager, Sales Promotion Dept., Plaskon Div., Libbey-Owens-Ford Glass Co. Mr. Brown spoke on "Design Factors in Large Urea Molding."

Second speaker was George H. Clark, vice-president, The Formica Co., who discussed developments and trends in thermosetting plastics laminates. Mr. Clark said that with the new specification standards as introduced in the United States, a statistically controlled basis for laminates would cut down on testing and yet would assure customers of more uniform quality. This industry now uses 30 different phenolic resins, 37 different liquid resins, 12 types of paper, and a wide variety of fabrics. New business in laminates will only be created, Mr. Clark declared, by the creation of new applications. Heat resistance is a most important factor in the newer developments.

Foam

"Rubber Phenolic Molding Powders and Phenolic Resin Foam" were discussed by Wyman Goss, Chemicals Materials Dept., General Electric Co. Essentially the same information presented by Mr. Goss was contained in the lead article in MODERN PLASTICS for February 1952.

Chairman at one morning session was E. R. Willing, Ontario Steel Products Ltd. The plans of Canadian Industries Ltd. for promoting sales of polyethylene from its new plant were discussed by Frank G. Rice, sales supervisor, Chemical Div., C.I.L.

Automotive Plastics

"Applications and Misapplications of Plastics for Automotive Parts" were discussed by J. K. Totten, supervisor, Rubber and Plastic Section, Quality Lab., Ford Motor Co. Mr. Totten broke automotive applications down into three groups: interior, exterior, and under the hood. Sub-classifications were functional, semi-functional, and decorative. Interior applications require dimensional stability at continuous operational temperatures of at least 170°

Challenge Clopay Plastics to do your job!

Clopay research has made revolutionary progress in the development of precision plastics with material characteristics of the widest versatility.

Clopay facilities and new compounding techniques offer new opportunities in the engineering of

Thermoplastics in
any extrudable profile to meet
your exact specifications.

- **RODS**
- **TUBES**
- RIBBONS**
- CHANNELS**
- HEETING**

For specific information write, wire, or phone . . .

INDUSTRIAL PRODUCTS DIVISION

CLOPAY
corporation

Clopay Square, Cincinnati 14, Ohio
Phone: DUaber 4800

New York: 386 Fourth Avenue, Room 608
Murray Hill 3-8066

POLYVINYL CHLORIDE

ACETATE

POLYSTYRENE

ACETATE-BUTYRATE

ACRYLICS

HIGH-IMPACT

HIGH STYRENE COPOLYMERS

Round, flat or unusual shapes in a complete range of colors . . . low and high temperature properties . . . hard or soft with required degree of toughness and dielectric strength to meet the most exacting specifications . . . any combination to satisfy difficult requirements for gaskets, mouldings, tubing, electrical insulation and other uses. Clopay Vinyl extrusions are an authentic improvement over rubbers (natural or synthetic) not a substitute.

CHECK THESE CLOPAY SERVICES

- 1. Fabrication of Vinyl film, supported and unsupported, and Polyethylene film for specialized uses.
- 2. Vinyl coating and embossing of papers and textiles.
- 3. Multi-color printing (surface and rotogravure) for decorative uses and military wrapping and packaging.
- 4. Precision fabrication of extruded and molded parts.
- 5. Precision slitting, electric-eye controlled cutting, die-cutting, electronic and thermal sealing, and high speed production line sewing of plastics.
- 6. Manufacture of cast Vinyl film for applications where uniform high strength and dielectric properties are required.
- 7. Complete Laboratory and Engineering facilities for research and development.



with EEMCO processing machinery

EEMCO presses, mills, refiners and crackers offer a minimum of production delays. Engineered right, built right and of best obtainable materials, EEMCO rubber and plastics processing machinery is serving many manufacturers throughout the world. Write for quotations on standard models or units built for your special needs. You will like the attractive prices and quicker deliveries.

RUBBER & PLASTICS MACHINERY DIVISION

EEMCO Erie Engine & Mfg. Co.
ERIE, PENNA.

F.; color fastness to light; chemical resistance to car cleaning solvents, auto finishes, and polishes; resistance to staining; and migration in contact with other organic substances. Exterior applications of plastics must be free from crazing, fading, or other degradation, which would detract from the car's function or appearance after three years exposure to sunlight in Florida and Arizona. Dimensional stability of plastics for exterior automotive application must be good at temperatures from -40° F. to 180° F. Chemical resistance is also a requisite. For under-the-hood applications, plastics must have continuous dimensional stability at 225° F. as well as resistance to oils, arcing, high voltages, acids, chemicals.

What's New?

Under the title, "What's New in Thermoplastics," Frazier Groff, Bakelite Corp., discussed new copolymers of styrene and modified styrenes which are due to expand the markets for styrene plastics.

Committee Reports

The annual general meeting of the S.P.I. (Canada) Inc. was held at a

luncheon meeting under the chairmanship of Howard Yates. A. E. Byrne, chairman of the Industrial Defense Preparedness Committee on Plastics, reported the activities of this group. Dr. R. V. V. Nicholls of McGill University outlined the work done by the S.P.I. Educational Committee. E. Barrington gave a report on the S.P.I. Tariff Committee's activities and announced that the Spring Budget would make public a report on tariffs for the plastics industry.

In a report on the S.P.I. Statistical Committee's activities, Mr. Byrne brought forth some interesting facts relative to the plastics industry in Canada. This committee estimates that there are today 325 compression molding machines and 200 injection molding machines in Canada.

Mr. Byrne pointed out that in the last six years the thermosetting molding industry in Canada increased 115% while the U. S. counterpart increased only 80%. There was a far larger expansion in the thermoplastics molding industry, where Canadian production increased 225% in the last six years and U. S. production increased only

120%. It is estimated that thermosetting sales in Canada totalled six million dollars last year, while thermoplastic sales totalled seven million dollars.

Officers Returned

The officers for the forthcoming year will be Howard Yates, president; A. E. Byrne, vice-president; G. Murray Scott, treasurer; R. Todd, director at large. These officers were returned by acclamation. The new chairmen of the seven trade sections of the Society will be elected in the near future.

Reinforced Plastics

Under the chairmanship of W. A. Campbell, a forum on reinforced plastics was held, with the following men comprising the panel: Robson Head, manager, Plastics Div., North American Cyanamid Ltd.; C. H. Rybolt, Lucidol Div., Novadell-Agencorp.; C. W. Ness, Fiberglas Canada Ltd.; R. E. Nelson, Canadian General Electric Co. Ltd.; W. M. Keddie, Polyfiber Ltd.; F. D. Johnson, Structural Plastics; Norman Edgar, M.R.F. Canada Ltd.; and John Bell, Smith & Stone Ltd.

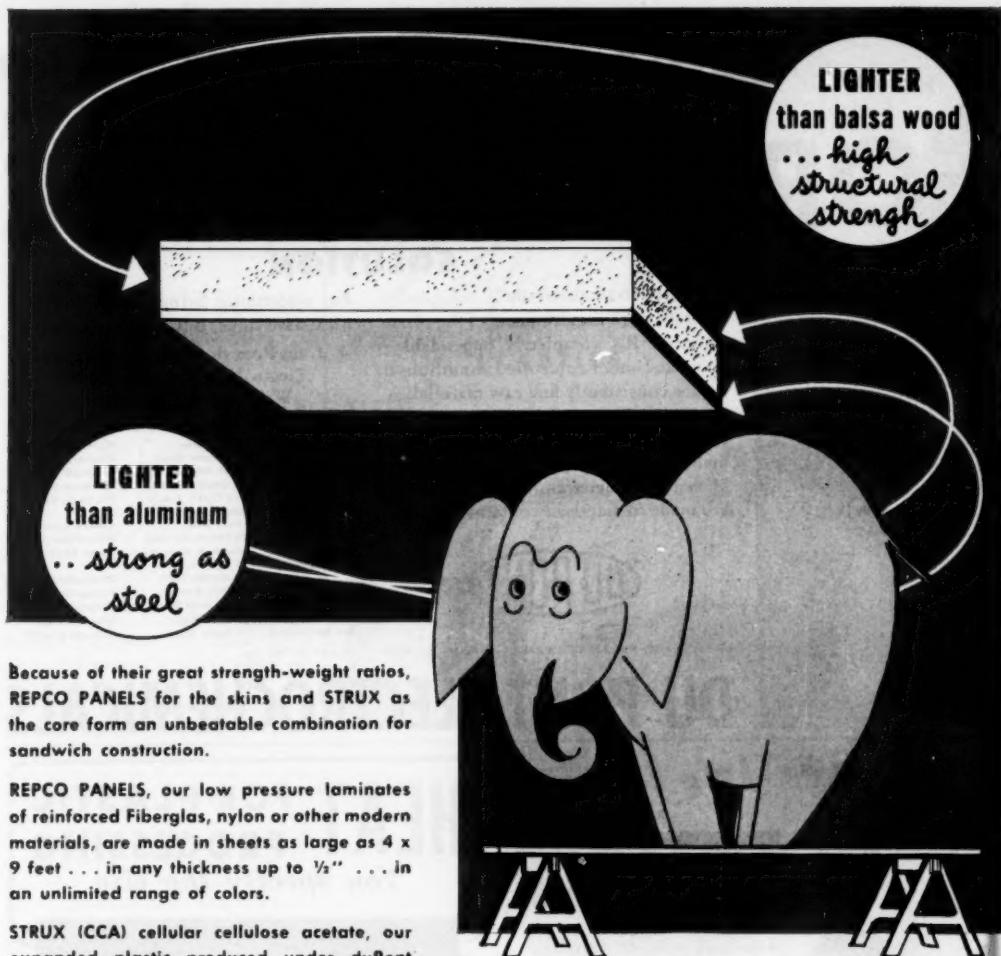
SCRAP AND VIRGIN Plastics

CUSTOM GRINDING
PROCESSING
CLEANING
GRADING

A. Schulman Inc.

SCRAP and VIRGIN
Plastics

AKRON, OHIO NEW YORK CITY BOSTON, MASS. ST. LOUIS, ILL.
790 E. Tallmadge 500 Fifth Ave. 738 Stoller Bldg. 14th & Converse
Hemlock 4-1242 L'Orange 4-5960 Liberty 2-2717 Bridge 5326



Because of their great strength-weight ratios, REPCO PANELS for the skins and STRUX as the core form an unbeatable combination for sandwich construction.

REPCO PANELS, our low pressure laminates of reinforced Fiberglas, nylon or other modern materials, are made in sheets as large as 4 x 9 feet . . . in any thickness up to $\frac{1}{2}$ " . . . in an unlimited range of colors.

STRUX (CCA) cellular cellulose acetate, our expanded plastic produced under duPont license, is extruded continuously in rods, boards or special shapes.

All REPCO PLASTICS possess an interesting combination of properties . . . physical, electrical, thermal, chemical and decorative. STRUX has unusual buoyancy in water, oil and other liquids.

LEST YOU FORGET, we also maintain the largest battery of presses for matched die molding of parts made to aircraft tolerances. Our other facilities include molding by the vacuum bag technique and the fabrication of laminated phenolics, wood, nylon and melamine products.

REPCO PLASTICS and STRUX have applications in almost every existing industry. Let us show you how they can be used in your business.

Write today for details and samples.

Repco Plastics

Associated
Companies

West Coast
Representative

Distributor

by Russell REINFORCED PLASTICS CORP.
WEST HOFFMAN AVENUE, LINDENHURST, L.I., N.Y.

STRUX CORPORATION
AIRCRAFT SPECIALTIES CO., INC.

REGAL PLASTIC COMPANY

ALLIED PRODUCTS ENGINEERING CO.

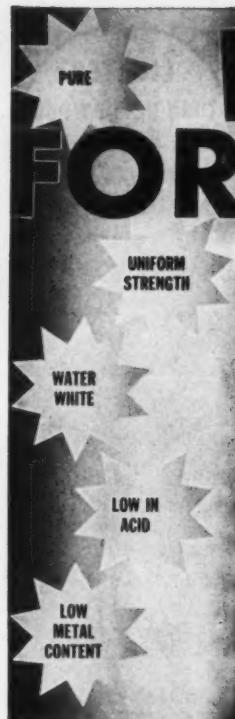
WESTERN FIBERGLAS SUPPLY CO.

Lindenhurst, L.I., N.Y.
Hicksville, L.I., N.Y.

Kansas City 6, Missouri

Los Angeles 43, California

Los Angeles 13, California



DU PONT

FORMALDEHYDE

SOLUTION

DU PONT FORMALDEHYDE is designed to meet the high requirements of the plastic industry. It's completely dependable—produced under controlled conditions to assure consistently fine raw material.

SHIPMENTS of Formaldehyde, Paraformaldehyde, 95% minimum strength, and Hexemethylenetetramine—Technical—are made in standard containers.



BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

For additional information and technical assistance, call our nearest office.

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department
Wilmington 98, Delaware

DISTRICT OFFICES

Baltimore 2	321 Fallsway	Plaza 2862
Boston 10	140 Federal Street	Hancock 6-1714
Charlotte 2, N.C.	427 W. 4th Street	Charlotte 5-5361
Chicago 3	7 S. Dearborn Street	Adelphi 3-7000
Cincinnati 2	2412 Carew Tower	Parkway 5253
Cleveland 14	1226 National City Bank Bldg.	Cherry 1-6078
Detroit 26	966 Penobscot Bldg.	Woodward 2-7380
Kansas City 1*	Guinotte & Mich. Aves.	Vicer 6340
Los Angeles	P.O. Box 70, El Monte, Calif.	Cumberland 3-2761
New York 1	330 Fifth Avenue	Longacre 3-6446
Philadelphia 3	1616 Walnut Street	Kingsley 3-1900
Pittsburgh 22	117 Park Bldg.	Grant 1-2960
San Francisco 6	111 Sutter Street	Elkbrook 2-4230

*Barada & Page, Inc.

DU PONT ELECTROCHEMICALS

CUT PACKAGING TIME...
WITH THIS
FASTER BAGGER



The Anderson Bagger, Model 134, is designed to handle bagged products at a fast rate with a minimum of effort. Simple adjustments for height and tilting forward or backward enables the operator to set the machine at the most advantageous position. He can fill the bag and place it in the carton in one operation. The stainless steel bag trough, capacity 200 bags, may be loaded from front or back. Simple adjustments for bag sizes.

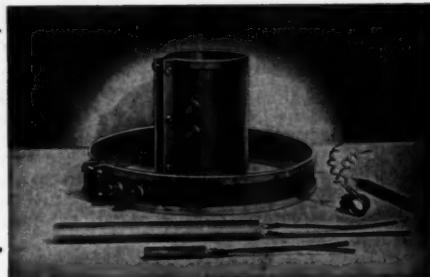
Blower, equipped with air filter, opens bag and keeps it free from foreign matter.

Send Today
for
Bulletin
No. 5-31



ANDERSON BROS. MFG. CO.
ROCKFORD, ILLINOIS

**HEAT FOR PLASTIC
PROCESSING**
You specify the size



ELECTRIC HEATERS of ALL TYPES

- For Machine Parts
- For Liquids
- For Air

**ALSO SPECIAL REQUIREMENTS
INDUSTRIAL HEATER CO., INC.**

1921-1952

245 Canal St.

New York 13, N. Y.

Embedded Display

An edge-lighted, rotating acrylic cube, in which are embedded all 157 internal parts of the Rolex self-winding watch, is the glittering display assembled by Robert M. Hansen Co., New York, N. Y., for American Rolex Watch Corp., New York. Colored lights transmitted through an acrylic rod extension are caught and reflected by the acrylic cube and embedded metal parts.

Embedding and casting of the 2½-in. cube is by Plastic Developments, Inc., Attleboro, Mass. The acrylic rod (½ in. in diameter and 1½ in. long) is set into a hole drilled in one corner of the cube. This rod rests in a hollow brass pillar attached to a 4½-in. diameter, ½-in. thick acrylic disk. The disk, which has reverse engraved letters on the under side, is set into a cast aluminum base unit housing the light and a rotating mechanism. The letters, engraved by Hermes Engravers, Inc., New York, are gold-filled and then over-sprayed with green.

Rotation mechanism consists of a gear, fabricated of phenolic laminate, which meshes with a metal gear attached to the bottom of the brass pillar. The pillar has ball bearings. As the light travels from source to acrylic rod, it passes through an acrylic filter attached to the phenolic gear and painted in seven different colors. The filter turns with the gear and changes the color of the light. Kent Laboratories, Hawthorne, N. J., assembled the color changer.

Rotating lighted display (top) has two acrylic parts and metal base (bottom)



• *From the right plastic . . . by the right process . . . Watertown promises you the perfect product, whatever your specifications might be. Our injection, compression and transfer molding machinery is up to the minute . . . and our laboratory, second to none in the industry, has every testing device to insure development . . . and production, of products, parts or packages that meet the most exacting requirements. In the final analysis, an experienced staff of designers, engineers, chemists and production men . . . working with top-notch equipment . . . remains your best possible assurance of a job well done.*

For the complete plastics job, from idea to delivery, consult . . .



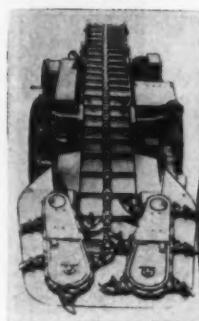
The Filters that Manufacturers Specify—



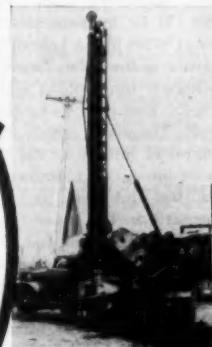
Die Casting Machine. Lester Phoenix, Inc., Cleveland, O.



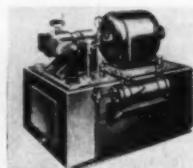
Drilling Rig. Emsco Derrick & Equipment Co., Los Angeles, California



Underground Loading Machine
The Clarkson Mfg. Company
Nashville, Illinois



Hole Digger
Hugh B. Williams Mfg. Co.
Dallas, Texas



Hydraulic Pumping Unit
Dennison Equipment Co.
Columbus, Ohio

O. E. M. Choice of Over 270 Manufacturers

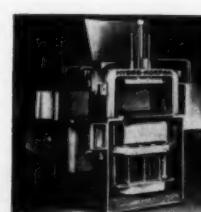
In 1951 Alone Over 30,000
MARVEL SYNCINAL FILTERS

were specified for O.E.M. or user installation on all types of hydraulic and oil recirculating equipment. Illustrated are machines representative of the many which are protected by Marvel Syncinal Filters. Reasons for this overwhelming preference include:

Greater ACTIVE filtering area; Longer operation before cleaning; Simplicity that enables any workman to do the infrequent cleanings quickly and on the spot.

NOW AVAILABLE FOR WATER FILTERING

Line types operate in any position and may be serviced without disturbing pipe connections. Both sump and line types available in capacities of 5 to 100 g.p.m. and in mesh sizes from 30 to 200.



Masonry Block
Making Machine
W. E. Dunn Mfg., Holland, Mich.

Write for Data
Specify Oil or Water



Meets
J. I. C.
Standards

MARVEL ENGINEERING COMPANY
625 W. Jackson Blvd. Chicago 6, Ill.

For products
waiting to be
made



PLASTISOLS
for moulding or coating

ORGANOSOLS
for fabric or paper
coating...for dipping

Government specifications for low temperature flexibility and fungus resistance are hard to meet, but Stanley-formulated plastisols and organosols can do the job.

Competitive selling to consumers is tough, too, but Stanley vinyls have been making products look better, last longer, and move faster from dealers shelves for years.

Perhaps your product can profit from our long experience in the vinyl field: write today, The Stanley Chemical Co., 71 Berlin St., East Berlin, Conn.



May • 1952

Three-Way Dispensing Unit



Courtesy Plax Corp.

Squeezable polyethylene bottle doubles
as atomizer (top) or dropper (bottom)

FURTHER demonstration of the versatility of squeezable polyethylene bottles is offered by Med-Aid, a refillable dispensing container that is designed to be used three ways—as an atomizer, dropper, or dispenser. Used as an atomizer, Med-Aid is held in an upright position and squeezed firmly; as a dropper, the container is tilted and pressed gently; a harder squeeze squirts the contents of the bottle.

The bottle, which has a 2-oz. capacity, is blow-molded by Plax Corp., Hartford, Conn., and contains a small polyethylene tube, 0.042-in. inside diameter, supplied by Jessell Plastics, Inc., Hartford, that fits inside a threaded spray cap with one hole. The tube is gripped by three bosses protruding from the inside of the cap around the hole so that, although it is in line with the outlet, the tube does not completely seal the hole. This leaves enough space through which the liquid contents can flow when the container is used as a dropper. A top closure friction-fits over the spray cap. Apsco, Inc., Garfield, N.J., molds both components of the closure and assembles and markets the unit.

In addition to being unbreakable, this container is particularly suitable for medications because the polyethylene is odorless, tasteless, non-toxic, chemically inert, and non-corrosive.

Consult
Waterbury
for

MOLDED PLASTICS

Creative Service in Product Development

Research, Design, Engineering
Compression, Transfer, High Speed
Injection and Low Pressure Molding
Over a Century of Fine Tool and
Mold Work
Finishing, Assembling

•
PRODUCERS OF
PLASTIC CONTAINERS
FOR MANY
WORLD FAMED PRODUCTS

SALES OFFICES

NEW YORK 17, N.Y.
17 East 42nd St.
BOSTON 11, MASS.
99 Chauncy St.
CHICAGO 6, ILL.
223 W. Jackson Blvd.
PHILADELPHIA 3, PA.
117 South 17th St.
ROCHESTER 5, N.Y.
L. W. Sage, Inc.
33 University Ave.
DETROIT 7, MICH.
Wm. Robert Wilson & Associates
6460 Kercheval Ave.

•
Our technical staff will
gladly confer with you

•
Write for Waterbury
Plastics Catalog 'M'

•
**WATERBURY
COMPANIES, INC.**
Waterbury, Conn.



tumb-l-matic

FINISHING PROCESSES

**Give Finer Surfaces
at Least Cost**

Automatically



Tumb-L-Matic's "Pushbutton" Processes—equipment, compounds, and techniques—AUTOMATICALLY impart that finer, touch-and-sell finish to your plastic products...at substantial savings. They provide closer control over finishing operations...enhance the saleability of your products through higher-quality definning, cutting, smoothing, and lustering operations. When properly applied, they eliminate costly buffing...free vital manpower for more productive work.

Tumb-L-Matic's extensive line of machinery and compounds, backed by a quarter-century of experience with a wide and broadening range of materials, permit the "tailored" selection of cost-saving standard processes to fit your particular products and production layout.

® 8198

Write and tell us about your product finishing problems...or
SEND A SAMPLE FOR COMPLETE ANALYSIS AND RECOMMENDED FINISHING PROCESSES

TUMB-L-MATIC, INC.
FORMERLY LUPOMATIC INDUSTRIES, INC.
4510 BULLARD AVENUE • NEW YORK 70, N.Y.

Anti-Static Applicator

A NEW principle for static control on plastic surfaces is reported by Electro-Chemical Products Corp., East Orange, N.J. Unlike other static control agents which are hygroscopic, this new line of compounds contains anti-statics in fast evaporating carrier solutions.

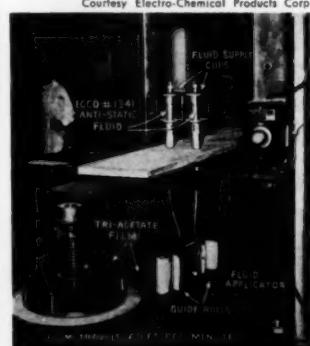
After the compound has been applied by wiping on, dipping, or spraying, the carrier evaporates and the treated surfaces are left with an invisible film of anti-static chemicals which render them conductive and hence electro-statically inert.

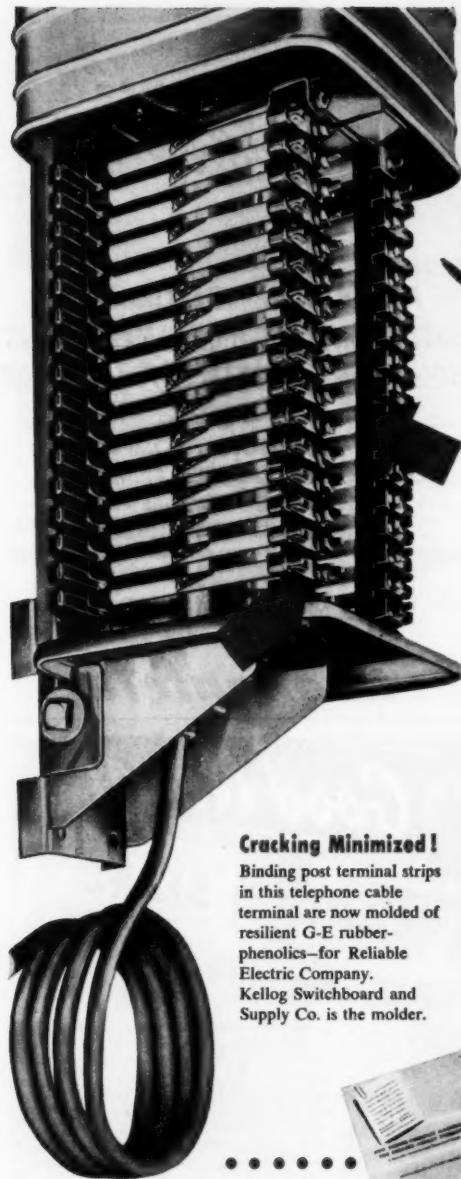
This anti-static coating is virtually permanent, unless removed by continuous abrasion or the action of cleaning solvents. Conventional hygroscopic agents which absorb moisture from the air to dissipate the static charge have a short life, break down easily, and often leave a greasy residue on the plastic surface.

Illustrated below is an interesting setup used by one manufacturer to apply anti-static fluid to tri-acetate film. The fluid, supplied by Electro-Chemical, is metered out of two drip cups onto two cloth pads which continuously wipe the acetate film passing between them. Before this applicator setup was devised, the manufacturer was faced with the following problem: the film was sent through the rollers at such high speed that severe static was generated which, in turn, attracted so much dirt that the finished product was unsatisfactory.

Factory setup for applying anti-static fluid to fast-traveling acetate film

Courtesy Electro-Chemical Products Corp.



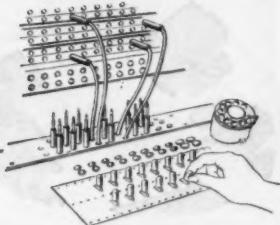


Cracking Minimized!
Binding post terminal strips in this telephone cable terminal are now molded of resilient G-E rubber-phenolics—for Reliable Electric Company. Kellogg Switchboard and Supply Co. is the molder.

HOW THE COMMUNICATIONS INDUSTRY BENEFITS FROM

Shock-Resistant

G-E RUBBER-PHENOLICS



Here's a case where the high internal resilience of shock-resistant General Electric rubber-phenolic compounds helped solve a troublesome cracking problem.

When conventional wood flour-filled phenolics were used for telephone cable terminal binding post strips, it was necessary to support the post strips with metal brackets to minimize cracking from mechanical and electric shock—an expensive solution and one which was detrimental to good insulation.

By a simple switch to G-E rubber-phenolic wood flour-filled compounds, these costly and hazardous metal brackets were eliminated. This highly *resilient* plastics has the strength and flexibility to withstand the mechanical and electric shock . . . provides better insulation at lower cost.

This is a typical example of how resilient G-E rubber-phenolics—which have *more than five times* the shock-resistance of conventional phenolic materials—work successfully where ordinary impact materials fail. Designers and molders are using them for a wide variety of industrial applications—textile bobbins, business machine parts, appliance handles—to name a few.

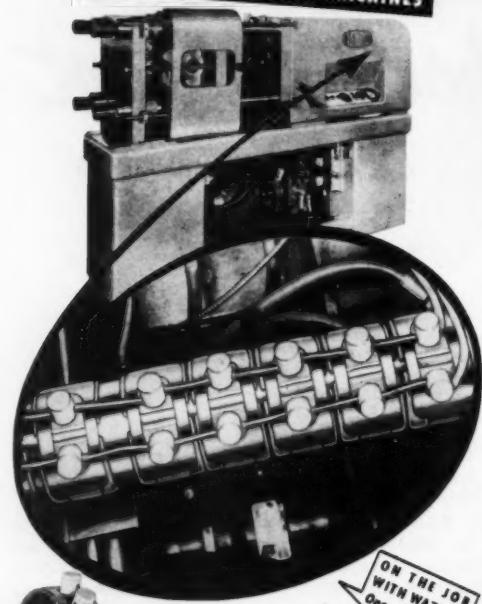
For more information about this rugged family of plastics, write today for a free copy of "New Rubber-Phenolic Materials for Greater Impact Strength." Address: General Electric Company, Section G-3, Chemical Division, Pittsfield, Mass.

You can put your confidence in—

GENERAL  ELECTRIC

**WHY LEWIS WELDING AND
ENGINEERING CORP. CHOSE**

WATLOW NARROW-BANDED
HEATING UNITS
FOR INJECTION MOLDING MACHINES



More and more plastics equipment manufacturers—like the Lewis Welding and Engineering Corp. of Cleveland, Ohio—are specifying Watlow Units as original equipment. There's a reason. Watlow offers:

RATINGS AS HIGH AS 45 WATTS/SQ. IN.

Compact, lightweight design for quick-responding heat conduction . . . minimum temperature lag.

GREATER FLEXIBILITY

Individual bands can be conveniently built up into groups, uniformly distributed in three phases for series, parallel and γ -delta connections—as the heat needs dictate. Single burn-outs mean minimum down-time and interruption.

LONGER LIFE

Narrow band construction, plus patented clamping band design, assure close contact at all temperatures. This means maximum heat transfer . . . lower internal operating temperature. Result: longer life, fewer burnouts.

WRITE for FREE CATALOG
Strips, bands, cartridges,
immersion heaters.

WATLOW

Since 1922—Designers and Manu-

facturers of Electric Heating Units

ELECTRIC MFG. CO.

1364 FERGUSON AVE.

SAINT LOUIS 14, MO.

INORGANIC PIGMENTS

for plastics

**PERMANENT • DEPENDABLE
RESIST FADING AND HIGH TEMPERATURES
INSOLUBLE IN SOLVENTS and PLASTICIZERS**

Suitable for

**CASTING • INJECTION or COMPRESSION
MOLDING • CALENDERED FILMS AND
COATING PROCESSES**

LET US KNOW THE APPLICATION

B. F. DRAKENFELD & CO., INC.
45-47 Park Place, New York 7, N. Y.

Drakenfeld

Good News!

LARGER SIZES

Polyethylene Sheets

Compression molded thermoplastic sheet users now have available larger sizes of Acadia polyethylene. These are available in the new size of 36" x 36" x $\frac{1}{8}$ ".

Standard sizes are furnished in 20" x 20" from $\frac{1}{8}$ " to 1" thick and 24" x 24" from $\frac{1}{8}$ " to $\frac{1}{2}$ " thick.

Special sizes are also available. Polystyrene, Tenite, Saran, Vinylite, Gau, Ethyl-Cellulose and Styrene sheets can be compression molded in most of the above sizes.

Wire or write for specifications.

Acadia Synthetic Products Division

WESTERN FELT WORKS

4035-4117 Ogden Ave. • Chicago 23, Ill.



ACADIA

Processors of Synthetic
Rubber and Plastic • Sheets
Extrusions • Molded Parts

Synthetic
PRODUCTS

MANUFACTURERS AND CUTTERS OF WOOL FELTS

Modern Plastics



All photos courtesy Bakelite Co.

Sprinkler is set up by joining garden hose to standard threaded butyrate coupling on flower pot base. Metal spike on coupling is thrust into the ground to anchor the pot



Water is sprayed through vinyl tube (flower stem) that rotates rapidly under normal or low water pressure and distributes an even spray that can water a 1200-sq. ft. area

Lawn Sprinkler in Plastics

A STYRENE flower growing on a vinyl stem in a butyrate flower pot is really a lawn sprinkler, yet looks like a decorative new *genus florae* when not in use.

Called The Spray Flower, the new sprinkling device connects with any garden hose by means of a standard threaded butyrate coupling which is attached to the base of the flower pot. Water is sprayed through a flexible vinyl tube that

acts as the stem of the flower and is held upright by a length of wire inserted through the tube. The sprinkler system can be regulated so that it will water any circular area up to 1200 sq. feet.

Emenee Industries, Inc., New York, N.Y., molds and assembles the entire lawn sprinkler. Bakelite Co. supplies the vinyl and styrene, and Tennessee Eastman the butyrate.

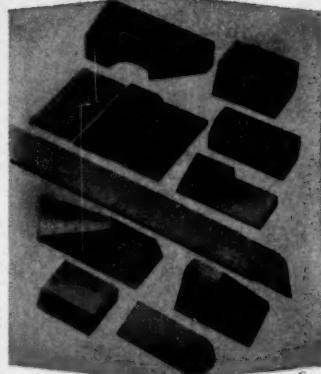
To determine maximum spray coverage, bowls were interval-spaced from sprinkler. After 24-hr. tests, all bowls within a 20-ft. radius showed the same water level

Decorative flower pot can be left on lawn when sprinkler is not in use. It resists corrosion and abrasion and is not affected by changes in temperature and humidity



CURBELL

EXPERIENCE
your guarantee
of a job done
RIGHT



When your blueprints call for machined, compound angles in plastic parts, call on Curbell. Illustrated are a few of the many types of compound angles we have produced in plastic materials.

Send us your inquiries for prompt quotations on the fabrication of: Laminated Phenolics — Vulcanized Fiber — Plexiglas — Lucite — Acetate — Vinylite — Royelite — Fiberglas — Glass Melamine and Silicone Glass.

**TERRITORIES AVAILABLE FOR
MANUFACTURERS' AGENTS—
INQUIRIES INVITED**

CURBELL INC.

767 Hertel Ave., Buffalo 7, N.Y.



HIGH-SPEED FINISHING

means better molded plastics for you

Modern equipment and facilities for mass-finishing of molded plastics parts *efficiently and economically*, is but one of many reasons why large and small manufacturers alike make General Industries their "first source" for *all* molded plastics requirements.

Write for General Industries' 16-page booklet, "Your Product in Plastic". Describes our complete facilities for handling every phase of molded plastic parts production.

THE GENERAL INDUSTRIES CO.

DEPARTMENT PA • ELYRIA, OHIO

HELPFUL FREE LITERATURE

EQUIPMENT · SUPPLIES · SERVICE

The literature and samples described here contain valuable data that will help increase the operating efficiency of your business.

After selecting the items you want, merely circle the corresponding numbers on the post card, fill in the information requested, and mail.

COLORS FOR POLYETHYLENE. Tables tell percentages of Ferro polyethylene colors which should be used in order to match Bureau of Standards polystyrene colors. Ferro Corp. (E-201)

TOOL AND MOLD SUPPLIES. Bulletin illustrates various mold makers supplies used for all steps from machining through assembly and finishing of cavities. Detroit Mold Engineering Co. (E-202)

LIQUID LOW PRESSURE THERMOSETTING RESINS. Technical data on Marco MR-Resins for laminating, casting, coating, impregnating, and molding at low pressure. Gives typical formulations. Marco Chemicals, Inc. (E-203)

COATING RESINS. Data on "Araldite" Resin 965 E which has considerable covering power on metals and is used as a liner for cans and collapsible tubes for corrosion protection. Ciba Co. (E-204)

METAL FACED "TEFLON." Data on "Chem-ele Multi-Bond," a metal faced dielectric material intimately uniting metals and pure or filled Teflon resins. Lists various face metals and fillings. United States Gasket Co. (E-205)

MONSANTO PLASTICS. Discussion, including the general properties of the Monsanto plastics—Lustrex, Cerex, Vespak, Vuelite, Fibestos, Nitron, Vinyl E tyral, Ultron, Resinox, and Resimene. Monsanto Chemical Co. (E-206)

FASTENER CATALOG. Uriquely illustrated catalog shows all essential types of screw fastenings. Gives general data, recommended uses, and suggests method of applying each. Continental Screw Co. (E-207)

"PLIOVIC AO" IN PLASTISOLS. Bulletin contains technical data on use of "Pliovic AO" vinyl chloride copolymer as a base for plastisols. Gives compounding and processing data and suggests formulations. Goodyear Tire & Rubber Co. (E-208)

PLASTIC SHEET AND ROD. Folder contains price lists on colored and clear acrylic, vinyl, and cellulose acetate sheet, acrylic rod, and acrylic, butyrate, acetate, and styrene tubing. Cadillac Plastic Co. (E-209)

CUSTOM MOLDING FACILITIES. Booklet briefly describes the facilities, equipment, personnel, and history of Worcester Molded Plastics Co. (E-210)

PROCESSING EQUIPMENT. Bulletin gives a resume of the activities of Farrel-Birmingham including complete processing layout and design and manufacture of Banbury mixers, mills, calenders, extruders, rolls, and power transmission equipment. Farrel-Birmingham Co., Inc. (E-211)

CONTINUOUS AUTOMATIC PROCESSING EQUIPMENT. Reprint discusses web and strand coating systems with particular attention to machine design. Shows typical arrangement of component machines. Industrial Ovens, Inc. (E-212)

SCRAP GRANULATOR. Bulletin describing the Van Dorn scrap granulator for rigid thermoplastic scrap. Features, specifications, and illustrations are included. The Van Dorn Iron Works Co. (E-213)

EXPANDER. Described is the "Free-Wheeling" expander for producing maximum width and eliminating wrinkles from coated fabrics and plastic films. Method of use, specifications, and prices are included. Mount Hope Machinery Co. (E-214)

CENTRALIZED LUBRICATION. Series of case studies on cost advantages connected with "Multival" centralized system of lubrication for various types of machinery. The Farval Corp. (E-215)

FOAM PLASTISOL. Technical report describes the properties and uses of a recently developed foam plastisol, from which expanded sheeting and coatings may be produced. Sample included. Interchemical Corp. (E-216)

VINYL CEMENT. Technical data sheet tells about an adhesive for use both in fabrication of flexible vinyl products and for articles made of rigid vinyl sheets or molded sections. Schwartz Chemical Co., Inc. (E-217)

ELECTRIC HEATING UNITS. Catalog contains specifications and prices of many types of electric heating units including cartridges, strips, cylinders, hot plates, and immersion heaters with applications within the plastics industry. Watlow Electric Mfg. Co. (E-218)

PULVERIZERS. Data sheet on Mead high-speed impact mills with outputs from fifty lb. to eight tons per hr. for every pulverizing requirement. Mead Mill Co. (E-219)

LABORATORY MACHINES. Illustrated booklet containing specifications of various Sturtevant laboratory crushers and grinders for reducing the size of a variety of materials. Sturtevant Mill Co. (E-220)

STABILIZER. Technical service report on Witco stabilizer, No. 80 for nearly all applications of polyvinyl chloride resins including plastisols and organosols. Witco Chemical Co. (E-221)

ELECTRIC POWER DRIVES. Detailed information, including diagrams and illustrations, on improved Sterling "Kload-Tite Fan-Cooled" and the "Kload-Tite" enclosed electric power drives. Sterling Electric Motors. (E-222)

Fill out and mail this card now

MODERN PLASTICS

Manufacturers' Literature Service

I am interested in the following items:

E-201 E-202 E-203 E-204 E-205 E-206 E-207 E-208 E-209 E-210 E-211
 E-212 E-213 E-214 E-215 E-216 E-217 E-218 E-219 E-220 E-221 E-222
 E-223 E-224 E-225 E-226 E-227 E-228 E-229 E-230 E-231 E-232 E-233
 E-234 E-235 E-236 E-237 E-238 E-239 E-240 E-241 E-242 E-243 E-244

If you do not now subscribe to MODERN PLASTICS, but wish to receive the next 12 issues (\$8 everywhere), just check here

NAME POSITION
 (Please Print Clearly)

COMPANY

STREET CITY STATE

(Not valid after August 1, 1952)

HELPFUL FREE LITERATURE

EQUIPMENT • SUPPLIES • SERVICE

The literature and samples described here contain valuable data that will help increase the operating efficiency of your business.

After selecting the items you want, merely circle the corresponding numbers on the post card, fill in the information requested, and mail.

PROCESSING TECHNIQUES FOR "KEL-F." Technical bulletin gives general operating data on pressing sheet material, compression, injection, and transfer molding and extrusion of "KEL-F" trifluorochloroethylene resin. The M. W. Kellogg Co. (E-223)

CUTTER AND TOOL GRINDER. Full descriptive catalog on the Cincinnati Monoset cutter and tool grinder for making new end mills, reamers, counterbores, etc., and for reconditioning old ones. The Cincinnati Milling Machine Co. (E-224)

LAMINATED PLASTICS. Illustrated booklet containing a thorough discussion of laminated plastic made with Bakelite phenolic varnishes, their properties and advantages. Bakelite Co., Div. of Union Carbide and Carbon Corp. (E-225)

AUTOMATIC HYDRAULIC PREFORMING PRESS. Leaflet describing 125-ton automatic hydraulic preforming machine, designed to produce tablets which are too large to be made on the conventional type mechanical tabletter. T. H. & J. Daniels Ltd. (E-226)

ELECTRIC HEATING. Bulletin entitled "100 Ways to Apply Electric Heat" illustrates and describes approved methods of electrically heating liquids, air, gases, machine parts, and processing equipment by using Chromalox electric heating units. Edwin L. Wiegand Co. (E-227)

COLORING AND CUSTOM COMPOUNDING OF PLASTICS. Brochure describes the production facilities of Westchester Plastics, which are devoted mainly to coloring and custom compounding of thermoplastic materials. Westchester Plastics, Inc. (E-228)

SLUSH MOLDING. Reprint from "Modern Plastics Encyclopedia" containing informative data on many phases of slush molding vinyl plastics. Watson-Standard Co. (E-229)

HYDROLAIRS. Advantages, specifications, features, and other information on Elmes Hydrolairs, power-operated production presses that have neither motors nor pumps. Elmes Engineering Div., American Steel Foundries. (E-230)

DECAL NAME PLATES. Discussion of various transferable color films which can be applied to molded or flexible plastic items for purposes of brand identification, instructions, etc. Contains design and use suggestions. The Meyercord Co. (E-231)

WORK FEED TABLE. Booklet containing installation photographs and detailed descriptions of the Bellows rotary feed table for feeding work to automatic machines. The Bellows Co. (E-232)

EXTRUDED PLASTICS. Brochure describes the latest applications of custom-made thermoplastic extrusions. Includes data on curved and spiral extrusions as well as on more conventional types. Shows many suggested end uses. Anchor Plastics Co., Inc. (E-233)

TEMPERATURE CONTROL UNIT. Data sheet describes new "straight line" temperature controller that automatically compensates for heat transfer lags. Includes specifications, diagrams, and applications. Wheelco Instruments Co. (E-234)

GRANULATING MACHINES. Facts regarding the Cumberland plastics granulating machines, designed expressly for plastics. Capacity, uses, advantages, etc., are included. Cumberland Engineering Co., Inc. (E-235)

TUBING AND FITTINGS. Descriptions and complete specifications of various sizes of saran tubing and fittings. Includes technical data and physical and mechanical properties. Elmer E. Mills Corp. (E-236)

M.P.C. FACILITIES. Booklet explains the facilities available for custom compression molding and other supplementary activities at Molded Products Corp. (E-237)

COLOR ON CORRUGATED BOXES. Handy pocket size booklet telling how to use color to achieve the best effects when designing corrugated cartons. Hinde & Dauch Paper Co. (E-238)

MOLDING FACILITIES. Custom molder's services described from design of product to finished molded parts. Erie Resistor Corp. (E-239)

XALOY AND XALOY 306. Booklet describes the corrosion and abrasion resistance of two special metal surfacing alloys which have particular application in extruding machines. Industrial Research Laboratories, Ltd. (E-240)

MOLDING OF PLASTICS. A pictorial presentation of the facilities available at General Industries for engineering, mold making, compression, transfer, and injection molding and finishing of custom-molded plastics. The General Industries Co. (E-241)

TWIN SCREW EXTRUDER. The specifications and features of the R.C. 100 Twin screw extruder for all thermoplastics are contained in a folder by R. H. Windsor Ltd. (E-242)

LACQUER FOR STYRENE. Question and answer leaflet on New England gloss lacquers for finishing styrene. New England Lacquer Co. (E-243)

REVERSE ROLL COATER. Bulletin describes the "Contractor," a reverse roll coater designed to apply plastics, organosols, resins, and lacquers to paper, foil, film, or fabric. Dilts Machine Works, Div. of The Black-Clawson Co. (E-244)

Fill out and mail this card now



BUSINESS REPLY CARD

First Class Permit No. 2656 (Sec. 34.9, P.L. & R.), New York, N.Y.

MODERN PLASTICS

575 Madison Avenue

NEW YORK 22, N.Y.



CELLULOSE ACETATE

Available in crystal-clear, transparent and all colors—transparent, translucent and opaque. For injection molding and extrusion.



ETHYL CELLULOSE

Unsurpassed for impact strength and durability, AMPACET EC has been accepted by the Armed Services for a multitude of uses. Whenever your product calls for the superior qualities of Ethyl Cellulose molding compound make it a point to consult us.



POLYSTYRENE

SPECIAL COLORS — SPECIAL EFFECTS

PHOSPHORESCENTS for products that must glow in the dark, but retain their rich, colorful beauty in daylight.

MOTHER OF PEARL, the ideal plastic material for decorative articles — toilet wares and cosmetic containers, toys and nursery items, jewelry boxes,

bathroom fixtures, clock and instrument housings.

METALLICS AND TINSELS. Unusual effects of sparkling brilliance.

We custom color to your specifications—colors are matched accurately and kept constant time after time.



VINYL COMPOUNDS

For injection and extrusion, formulated to meet your specific requirements.

As manufacturers of prime thermoplastic molding compounds we are geared to fulfill the most rigid specifications. Also, our large plant facilities enable us to cooperate efficiently with customers' special requirements for storage and drop shipping.

AMERICAN
MOLDING POWDER
and CHEMICAL CORP.

AN AFFILIATE OF A. BAMBERGER CORPORATION

703 BEDFORD AVENUE, BROOKLYN 6, N. Y.

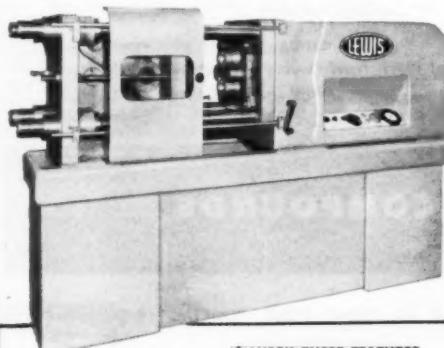
Phone: MAin 5-7430 • Cable: CHEMPROD BROOKLYN

®

PRODUCTION COSTS **UP**
DOWN **with a**
LEWIS MODEL 4
INJECTION MOLDING
MACHINE

Recommended for light-weight molding jobs having large projected areas, the new MODEL No. 4 LEWIS provides BIG machine production at the lowest operating costs.

In many instances the large platen will accommodate dies originally intended for machines having up to 8 ounce capacity. For the thousands of products weighing from 2 to 3 ounces . . .



**...SPECIFY
A LEWIS
No. 4!**

✓ CHECK THESE FEATURES

- ✓ Will handle practically any molding material
- ✓ Multiple shot injection for high production
- ✓ Fast opening crank-operated die lock mechanism
- ✓ Only 20 seconds or less to clear jammed nozzles
- ✓ Fully automatic operation
- ✓ Lowest maintenance required of any machine available today
- ✓ Will handle molds up to 12" x 23" vertically and 13-3/8" x 20" horizontally

Write today for illustrated technical catalog No. 101

607-1.W



11 INTERSTATE • BEDFORD, OHIO

Heating Element

SEALED between two sheets of polyester fibrous-glass reinforced plastic, a novel heating element being produced by Exmet Electrical Corp., Tuckahoe, N. Y., holds many possibilities for future development.

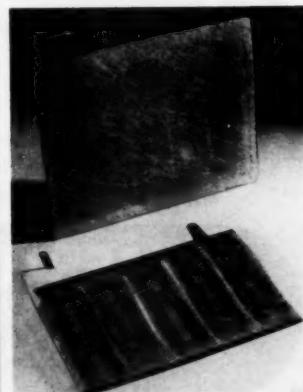
The element now being produced is designed to operate on a 24-v. supply, has a power consumption of 16½ watts, and maintains a surface temperature of approximately 150° F. The resistance unit is stamped from a single sheet of stainless steel with connections provided by one lug and a short length of wire spot-welded in place. After stamping, the unit is die-cut into five separate parallel electrical paths.

Before sealing, the resistance unit is placed on a sheet of resin loaded mat cut to size, and is tacked in position by local application of current to three or four segments of the resistor. Before the second sheet of loaded mat is put in place, the solid edges of the resistor unit are snipped in four places to form a continuous series path through the five grids.

With the second sheet of mat in place, the "sandwich" is placed in a simple hydraulic press with electrically heated platens which are maintained at a temperature of 290° F., with an allowable variation of 5°. Pressure is only about 200 p.s.i. and cure time is about 5 minutes.

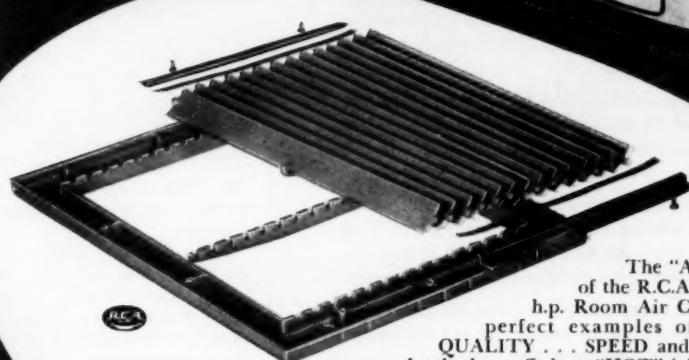
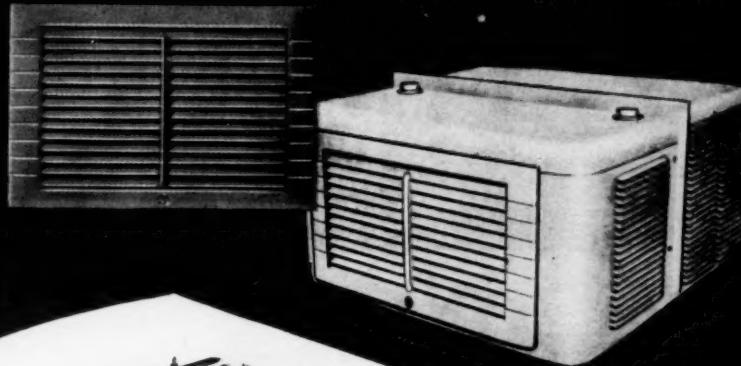
Owens-Corning Fiberglas mat, resin loaded by U. S. Polymeric Chemicals, Inc., Stamford, Conn., is used.

Heating element (bottom) is sealed between polyester Fiberglas sheets (top)



Modern Plastics

HOT *Santay*...QUALITY...SPEED...ECONOMY



The "Airflow" Grilles
of the R.C.A. $\frac{1}{2}$ h.p. and $\frac{3}{4}$
h.p. Room Air Conditioners are
perfect examples of how Santay's
QUALITY...SPEED and ECONOMY can
take the heat off those "HOT" jobs.

Santay not only molds all the component parts in these
R.C.A. Grilles of high impact polystyrene and manufactures
the metal parts too... but also processes complete assembly
of the finished product on-the-spot. Here is top QUALITY,
required by the high standards of R.C.A... SPEED, be-
cause of Santay's complete facilities, and ECONOMY,
because of Santay's thorough know-how.

If your plastic requirements are "HOT"... let a
Santay engineer help "COOL" them off...
they can do it. Phone or write today!

Santay

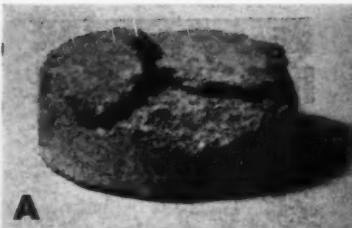


SANTAY CORPORATION

355 N. CRAWFORD AVENUE, CHICAGO 24, ILL. Phone Sacramento 2-3900

REPRESENTATIVES: GEORGE H. TIMMINGS & CO., 1802 N. DAMEN AVE., CHICAGO 47, ILL. - QUEISSEY BROS., 110
E. 97TH ST., INDIANAPOLIS 2, INDIANA - STANLEY J. ROBERTS & E. H. VANNWICK, 5259 GENERAL MOTORS BLDG.,
DETROIT 2, MICH. - C. E. WHITE & CO., BULKLEY BLDG., CLEVELAND 15, O. - WILLIAM S. RICHARDS COMPANY, NO. 25
BRENTWOOD BLVD., CLAYTON, ST. LOUIS 5, MISSOURI - E. J. EDMUNDS, 5344 IRVING ST., PHILADELPHIA 39, PENN.

INJECTION MOLDING • METAL STAMPING • ELECTRO-MECHANICAL ASSEMBLIES

**A****B**

NOT
MAGIC
—but
METASAP

Photo A shows a preform obtained during the course of routine manufacturing operations at the plant of a leading plastics molder. Since delaminated preforms such as this represented too high a percentage of total preform production, a remedy had to be found.

Photo B shows a preform obtained from the same molding compound, handled by the same preform machine, after Metasap Calcium Stearate had been incorporated into the molding powder.

With the addition of the Metasap Calcium Stearate, it was found that preforms could be ejected with less than 25% of the pressure formerly required. As a direct result of such reduction in pressure, delamination was practically eliminated.

Many manufacturers today are finding that Metasap Zinc and Calcium Stearates not only assure perfect preforms, but provide other important benefits. For example:

with preforms — molding can be done with machines of less tonnage, and molding materials are conserved.

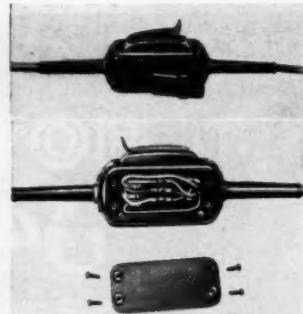
with finished products — output is increased, because molded pieces are easily and quickly released from molds; and rejects are decreased, because clean-cut, more marketable end-products are obtained. Also, mold life is lengthened, since scoring is avoided.

If you stress precision fabrication, especially from intricate molds, you will find these advantages offered by Metasap Zinc and Calcium Stearates exceptionally profitable.



METASAP CHEMICAL COMPANY, Harrison, N. J.

Chicago • Boston • Cedartown, Ga. • Richmond, Calif.



Courtesy Auburn Button Works, Inc.

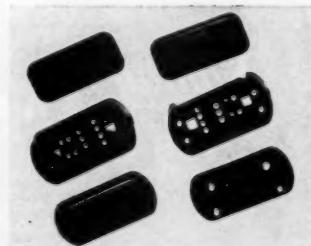
Top: Assembled through-cord switch is molded of phenolic. **Bottom:** Back of switch has four molded-in brass inserts

Phenolic Switch

A THROUGH-CORD switch molded of phenolic by Auburn Button Works, Inc., Auburn, N.Y., is a component part of a telephone operator's headset-handset unit manufactured by Roanwell Corp., Brooklyn, N.Y., for the U. S. Signal Corps. Used with a military type portable switchboard for ground forces voice communications, the new switch permits the operator to talk over telephone lines or broadcast by radio. A single pressure at the switch closes either of the two circuits. Bakelite Co. supplies the phenolic.

There are three plastics parts in the switch. The front cover and the back, which has four molded-in brass inserts, are both produced in two-cavity compression molds. The switch body, which has 13 brass inserts, is formed in a two-cavity high-speed plunger mold; plunger hole is molded with side draw.

Plastics parts in switch are (from top to bottom): back, body, and front cover



Modern Plastics



There's an idea
here for you!



MODERNIZE
YOUR HOME

WILSON
HOME FURNITURE

WILSON
HOME FURNITURE



Modernize your packaging

H & D corrugated boxes cover every specification for protective, economical, attractive, easy-to-handle packaging. Modern corrugated boxes, like those above, are made to withstand rough handling in shipment. They are light in weight, easy to set up, easy to pack. The product is colorfully advertised all along the line from manufacturer to ultimate

user. Whatever the product, you'll always find H & D corrugated boxes designed to meet all shipping, storage, display and sales requirements.

Make the H & D Package Laboratory *your* packaging department. For the 14-volume "Little Packaging Library," write Hinde & Dauch, 5211 Decatur Street, Sandusky, Ohio.

H & D

HINDE & DAUCH

Authority on Packaging

A COMPLETE INDUSTRIAL MOLDING SERVICE

INJECTION
COMPRESSION
EXTRUSION



Specialists in Production of Register and Counter Wheels

Illustrated here is the varied assortment of indicating wheels we have produced for meter manufacturers, calculating and adding machines, and for every industry where computing and indicating wheels are required.

Wheels can incorporate gears and cams or other actuating mechanisms. Produced in nylon and other plastics.

Our special processes for applying numbers include printing, molding-in recessed characters and filling with color, and doubleshot wheels with characters that cannot be scratched off.

Perhaps your own product can benefit from our know-how. Standard set-ups provide low-cost tooling. Call our plant for engineering service. Write today for illustrated brochure.

AMERICAN PLASTICS CORPORATION

BAINBRIDGE, N.Y. • 225 W. 34th STREET, N.Y. 1, N.Y.
(Producers of AMEROID—most beautiful casein plastic)

SPLCORP
RIGID PLASTIC SHEETS

CORRUGATED or PRESS POLISHED

transparent, translucent or opaque
manufactured to your specifications

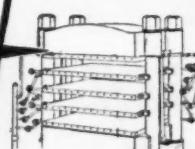
YOUR REQUIREMENTS for custom-manufactured thermoplastic sheets, either corrugated, press polished, embossed or laminated, can be met by Scranton Plastic Laminating Corp. We manufacture close tolerance Splicorp sheets from .005" to 2" thick, up to a maximum of 51" by 108". And high compression laminated sheets up to 50" wide and 72" long, of phenolic, silicone or esters.

Among the materials which we can incorporate in these sheets—both for the sake of appearance and for strength—are wood, Fiberglas, wire screen, metal foil, fabric and paper. Your inquiry will receive prompt attention.

SCRANTON PLASTIC LAMINATING CORP.

3218 PITTSTON AVENUE

SCRANTON 6, PENNSYLVANIA



displays
construction
decoration
lampshades
surfacing

Powder Palette

SIX shades of face powder, each packaged individually and set into a palette-shaped acetate tray, plus two measuring scoops, also made of acetate, are offered as a complete unit for mixing cosmetic preparations at home. Marketed by Peri, the "powder palette" is the first make-up package that provides a method of changing powder color without buying a new mixture.

Formed from 0.020-in. white extruded acetate sheet, the palette has a depressed section which holds the measuring scoops and eight circular bas-relief compartments. Six of the circular compartments are lined with clear, transparent acetate sheet that forms the containers for the different shades of powder; one compartment is used as a blending box; and one empty section, which has a white acetate cover, is used to store the blended mixture. The powder containers have tightly fitted transparent covers formed from 0.010- and 0.015-in. clear extruded acetate sheet. The tight fit of the lid helps keep the powder fresh and retain its fragrance.

Conrad-Parker, Inc., Los Angeles, Calif., formed the entire unit—tray, containers, and mixing spoons—from acetate sheet from Eastman Kodak Co., Rochester, N.Y.

The palette contains two basic primary shades of color and four concentrated shades. The concentrates are used to modify the primary shades. By varying the quantity of the concentrated shades, the color of the blend can be changed for day, evening, or seasonal use.

Pre-packaged cosmetic unit is formed entirely from extruded acetate sheet



Adamson United maintains gage uniformity by using TIMKEN® bearings on roll necks

THE rolls of the Adamson United 36" x 92" and 8" x 16" 4-roll calenders shown below are mounted on Timken® tapered roller bearings. As a result, accurate gage of plastic film is maintained longer than is possible with sleeve type bearings. Rolls stay in accurate alignment maintaining uniform gage the length of the sheet.

By eliminating friction between roll neck and bearing, Timken bearings eliminate roll neck wear. The

calender maintains precision with fewer overhauls, and downtime is reduced because roll necks don't require regrinding. Wear within the Timken bearings themselves is negligible because of their true rolling motion and smooth surface finish of rollers and races.

The gear stand driving the larger calender is also equipped with Timken bearings—a total of 19.

Tapered construction of Timken bearings permits them to take both

radial and thrust loads in any combination. Due to line contact between rollers and races, Timken bearings have load capacity to spare. Get the advantages of Timken bearings in your calenders, mills, refiners, and mixers. For full information, write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".



This symbol on a product means its bearings are the best.

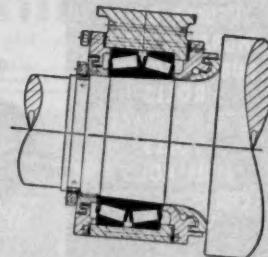
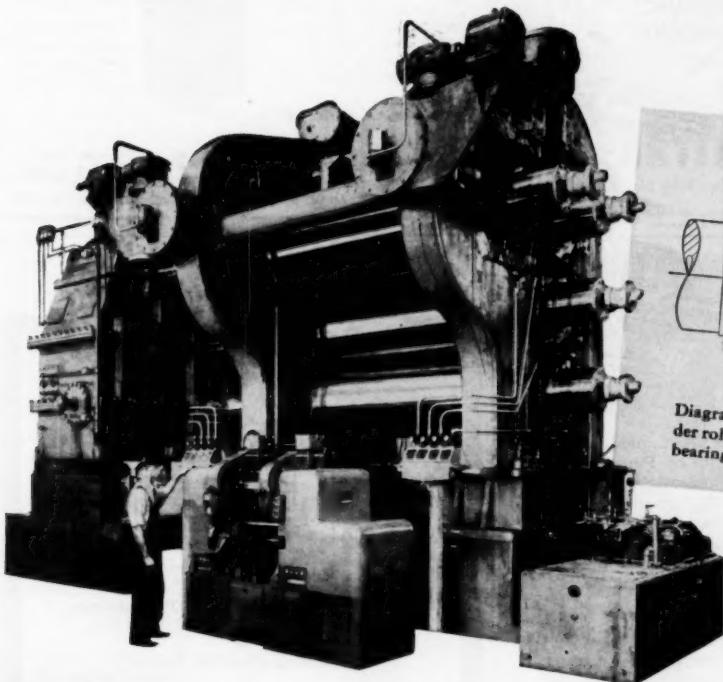


Diagram shows typical calender roll application of Timken bearings.

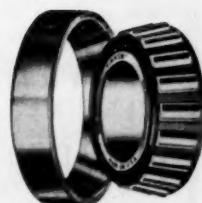


WE MAKE OUR OWN STEEL

The special grade alloy steel which gives Timken bearings their strength and resistance to wear is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in:
1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION



NOW! Dependable

PAMARCO

quality in
ROLLS FOR EVERY PURPOSE

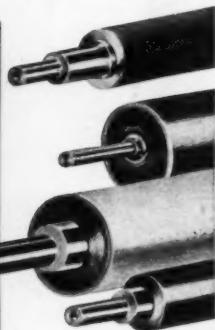
FEATURING —

**Precision Quality
Fast Delivery
Complete Service**

— ONE RELIABLE SOURCE
FOR ALL ROLL REQUIREMENTS



LIGHT DUTY ROLLS
HEAVY DUTY ROLLS
TUBULAR ROLLS
ENGRAVED ROLLS
RUBBER COVERED
ROLLS
WARM SURFACE
ROLLS
CHILL ROLLS
CHROME PLATED
ROLLS



When you need rolls for light, medium or heavy duty, you can depend on Pamarco for precision built rolls, economically produced and accurately engineered. Pamarco experience in tubular construction, solid steel and rubber coverings assures years of dependable service. All Pamarco rolls are ground finished to exact specifications and fully inspected before shipment.

Recommendations on specific applications — The wide experience of Pamarco engineers is available to help solve your roll problems. For complete engineering service — without obligation — write outlining your requirement.

CALL NOW FOR FAST, COMPETENT SERVICE!

PAMARCO

Precision Rolls for Textiles, Plastics
and General Industrial Service
Engraved Applicator Rolls
Plate Rolls for Aniline Presses

PAPER MACHINERY AND RESEARCH INC.
1014 OAK STREET, ROSELLE, NEW JERSEY

Twist Cap of Thermocouple & Plug In Connector



Thermocouple
circuits completed that
quickly with Thermo Elec-
tric Bayonet Immersion Contact
Thermocouples and Connector Panels.

This temperature measuring system is principally used when embedded and removable thermocouples are required and when circuits are frequently broken.

Typical applications include plastic molding and extruding machines, permanent molding machines, pilot plants, test stands, engine cylinders, bearings, etc.



Type JBW Connec-
tor Panel with FS
Conduit Box for 1,
2, 3, 4, or 5 circuits.

Write for Catalog P

Thermo Electric Co., Inc.
FAIR LAWN NEW JERSEY

Shawnee
RECOLORATOR
DRY COLORS
**COLORS
FOR PLASTICS**

Red & Yellow
Cadmium Toners

(Subject to the limitation of NPA Cadmium
Order M-19 and Selenium Order M-91)

• Strontium Chromate Yellow

• Ming (Molybdate) Orange

• Organic Red, Maroons
Blue & Green Toners

Offerings based on extensive experience
with leading plastics manufacturers

KENTUCKY COLOR & CHEMICAL CO.
Incorporated

General Office and Works: Louisville, Ky.
Branches and Representatives in Principal Cities

Fifth N.P.E.

(Continued from pp. 87-8)

newest thing at the show as far as phenolics are concerned was the first public showing of the Durez platable phenolic material. This material, Durez 15615 Black, is a conductive phenolic specially formulated for molding articles which are to be subsequently plated. An article on this material is scheduled for early publication in *MODERN PLASTICS*.

Monsanto announced a new all-purpose phenolic, Resinox GP 1000, which is said to have superior flow characteristics, freedom from flash, fast cure, improved mold release, and greater uniformity. Fiberite Corp. showed new preforms which combine phenolic resin and fillers such as cord or asbestos. These preforms, said to be difficult to produce, are shipped to the user with guaranteed delivery.

An interesting phenolic application on display was a swivel chair with a one-piece molded Fiberite seat and back, a phenolic pedestal, and phenolic caster wheels.

Other Materials

In the cellulosics, the outstanding exhibit was Tennessee Eastman's demonstration of the extrusion of 4-in. diameter butyrate pipe. This demonstration served to dramatize the importance of the pipe market⁸ as an outlet for butyrate.

Another interesting cellulosic extrusion was the "twist rod" shown by Gering Products, Inc. The rod, which is suitable for umbrella handles, pocketbooks, and other decorative applications, consists of a clear transparent rod with a controlled spiral of colored material running up the center of it.

Gears, bushings, textile equipment parts, and similar applications accounted for the bulk of the nylon exhibits. Perhaps the most novel end products of nylon shown were cleats for football players' shoes.

In saran, the most noteworthy development shown by Dow Chemical Co. was short staple fiber for carpeting. This fiber makes possible a 100%

⁸ See "Progress Report on Plastics Pipe," beginning on page 75.

PARTITIONS FOR PROTECTIVE PACKAGING

MADE TO YOUR
EXACT
SPECIFICATIONS

WRITE, PHONE or WIRE
for QUOTATIONS on
YOUR REQUIREMENTS

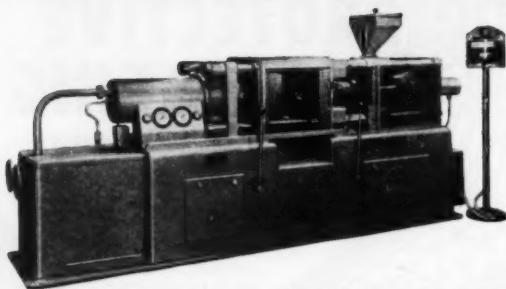
PETER PARTITION CORP.
Manufacturers of Cardboard Partitions

19-21 HEYWARD ST. Telephone: BROOKLYN 11, N.Y.

Plastic or Celluloid fabricating Equipment



MACHINES FOR THE PROCESSING OF THERMOPLASTIC AND THERMOSETTING MATERIALS



★ INJECTION PRESS: 120-150 Grs

LES MACHINES FOUCHER *Builders*

* EXPORTERS TO ALL COUNTRIES

* Models IN PRODUCTION :

* INJECTION PRESS :

Type F 30	capacity	30 Grs
> F 50	>	50 Grs
> F 120	>	120 Grs
> F 500	>	500 Grs

* COMPRESSION PRESSES

50 and 160 tons.

* SPECIAL NOZZLES

for Acetate and Superpolyamides



* GENERAL AGENT: LAVINO Ltd,
103, KINGSWAY - LONDON, WC 2



LITERATURE UPON REQUEST

30, AVENUE JEAN JAURES
ARCUAEL (SEINE) - FRANCE
TELEPHONE: ALESIA 50-36



TO ALL POLYSTYRENE MOLDERS LOOKING FOR A BETTER LACQUER

We'd like to introduce you to New England lacquer—an improved lacquer for your polystyrene moldings. It has high gloss, excellent adhesion, and good color retention. Blush resistant, quick-drying and easy to use, New England lacquer has all the qualities you've been looking for.

Nor'east Nautical, Inc. uses New England lacquer to give bright, decorative colors to its popular Howdy Doody Twinkle Doll Nite-Lite. Let us show you how this improved lacquer can make your finishing operations smoother, more economical!

Write for free booklet "New England Lacquer for Molded Polystyrene".

NEW ENGLAND LACQUER COMPANY

102 KING PHILIP ROAD, EAST PROVIDENCE, R. I.



GRIES CUTS COST AND TIME!

TINY INJECTION MOLDED PRECISION PLASTIC PARTS

Completely
automatic . . . parts
delivered trimmed,
ready for use, in one
operation with GRIES'
specialized produc-
tion facilities.
NYLON A SPECIALTY



INDIVIDUAL PARTS
No limit on small-
ness. Intricacy and
precision — our unique
features.



INDIVIDUAL INSERTS
Automatic insert feed
permits wide variety
of product possibilities.



CONTINUOUS INSERTS
Small members accu-
rately spaced on tape,
cord, wire, chain, etc.

Maximum size:
.020 in.—1 1/4" long
NO MINIMUM!

LOW MOLD COSTS
Write Today for
Samples and Prices

GRIES REPRODUCER CORP.

E. 133rd St. & Willow Ave., New York 54 • Phone MO 5-7400



saran carpet which is as soft as any carpeting fabric, strong, dirt-resistant, and easy to clean. Dow also showed a stuffed chair upholstered with saran fabric woven of small diameter monofilament. Another saran development was saran rubber which is used in sheet form to line tanks as a protection against corrosion.

Among the interesting fluorocarbon items shown, was a $\frac{1}{8}$ -in.-thick sheet of Kel-F about 3 ft. in diameter. This piece, one of the largest ever made from the material, was intended for an electronics application. An interesting Teflon piece was a large tubular insulator used on submarines between the antenna mast and the hull.

Machinery

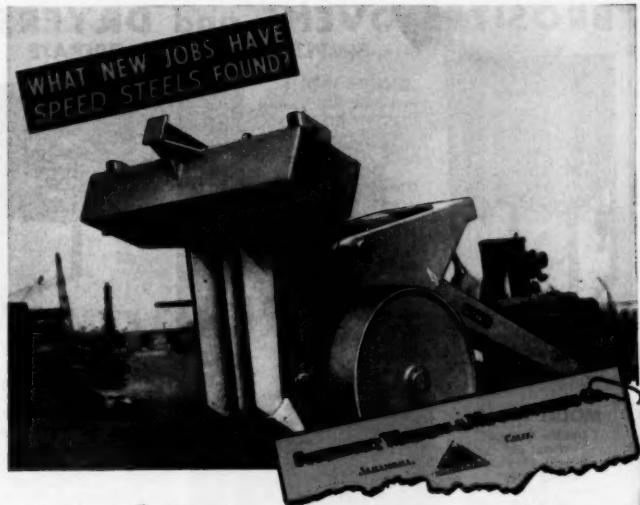
Out of the 137 exhibitors at the show, over 35 were machinery manufacturers. Of these 35, 10 are manufacturers of injection molding machines. Of the 10, seven companies had one or more injection machines in actual operation at the show. Each of the machines shown incorporated advances in machine design which permit faster and more economical operation.

The companies with one or more machines in operation were: The Fellows Gear Shaper Co., The Hydraulic Press Mfg. Co., Improved Paper Machinery Corp., Lester Engineering Co., Lewis Welding & Engineering Corp., Moslo Machinery Co., and Van Dorn Iron Works Co.

Baldwin-Lima-Hamilton Corp. had a new Model 60 preform press in actual operation. This unit was specifically designed to handle high-impact molding compound of the rag- or canvas-filled type. Each charge is automatically weighed on a scale hopper before being deposited in the hydraulically-operated preformer.

Laminating Press

Harcos Industries, Inc., showed a new type of thermoplastic laminating press which incorporates a rotating disk onto which the lamination sandwich is carried first to the heating platens and thence to the cooling platens, without removing the sandwich from the machine. According to the company, the machine makes



Speed Treat Steel Gives Powerful Brute A Tremendous Bite



The big teeth of this Southwest Cable Ripper have to penetrate rock hard surfaces up to 60" deep and withstand tremendous shock loads. A hard-packed airport runway, for example, snapped off ordinary steel shanks like toothpicks. To give this powerful brute teeth with a real bite Southwest is making them of Speed Treat (x1545) Plate Steel.

A tensile strength of 90-100,000 PSI and Brinell hardness of 156-196 imparts exceptional ruggedness and wearability to these vital components. Speed Treat is a versatile steel, too. Its unusual machinability plus its high physical properties, imparted by its .45% carbon and 1.25% manganese content, have won industry's favor for mechanical rubber molds, flame or induction hardened gears, sprockets, cams, eccentrics, cylinder bearers and countless other items, where machinability, finish, tool life and hardenability are important factors. Chances are you can improve your own product and save money with Speed Treat. Why not talk it over with your Speed Steel

Distributor? Literature on request.



DISTRIBUTED BY

Brown-Wales Co., Boston-Hartford-Lewiston, ■ Bridgeport Steel Co., Bridgeport, Conn.
 Beals, McCarthy & Rogers, Buffalo, N. Y. ■ Burger Iron Co., Akron, Ohio ■ Grammer, Dempsey & Hudson, Inc., Newark, N. J. ■ Earle M. Jorgensen Co., Los Angeles-Houston-Oakland-Dallas ■ Passaic County Steel Service, Inc., Paterson, N. J. ■ Peckover's Ltd., Halifax-Montreal-Toronto-Winnipeg-Vancouver ■ Peninsular Steel Co., Detroit, Mich.
 Pidgeon-Thomas Iron Co., Memphis, Tenn. ■ Horace T. Potts Co., Philadelphia-Baltimore

Produced by W. J. Holliday & Co., Inc., Speed Steel Plate Division, Hammond, Indiana. Plants: Hammond and Indianapolis, Indiana

BROSITES OVENS and DRYERS

• SIMPLE AND FAST TO OPERATE



MODEL NO. 1

Single Door: Width 24 $\frac{1}{2}$ "
 Five trays 15" x 22"
 x 1 $\frac{1}{2}$ "
 Height 50" — Depth 28 $\frac{1}{2}$ "
 Heating Element 1800 watts.
 Thermostatic Control 100° to 300° F.

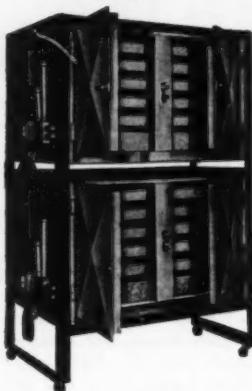
MODEL NO. 2

Double Door: Width 48"
 Height 50" — Depth 28 $\frac{1}{2}$ "
 Ten trays 15" x 22"
 x 1 $\frac{1}{2}$ "
 Heating Element 3600 watts.
 Thermostatic Control 100° to 300° F.

MODEL NO. 3

Double Decker:
 Width 48"
 Height 68 $\frac{1}{2}$ " —
 Depth 28 $\frac{1}{2}$ "
 Twenty Trays 15" x
 22" x 1 $\frac{1}{2}$ "

Model No. 3 is two Model No. 2 units placed one above the other. They can be operated independently of each other and the top unit can be used in reverse position whenever desired.



RUGGED, made to last . . . EFFICIENT, economical to use

The trays are of such size and design to hold approximately 10 pounds of the average material when placed to a depth of about one inch. Special trays of expanded metal allowing greater circulation of heat can be supplied and are recommended for the pre-heating of pellets and other solid objects. For special uses the trays, or the entire unit if required,

can be made of stainless steel, monel metal or nickel. Sturdy in construction, built of steel sheeting, carefully and thoroughly insulated with rock-wool insulation placed between the inside and outside shells of the dryer. Mounted on casters for easy movement from one location to another in the plant. Each unit is equipped with thermostat to automatically control temperature of the oven. A light indicates when unit is in operation.

• JUST PLUG IN AND TURN THE SWITCH



DE MATTIA
GRANULATOR

For the uniform grinding of Vinylite, Geon and all hard thermoplastics. Capacity: 200 lbs. per hr. 1/2 H.P. motor with double V belt drive. Four Steel Chopper Blades. Roller Bearings with Positive Seals. Screen with 1/4" openings.



DE MATTIA
Bench Model
GRANULATOR

For at-the-machine operation (Can also be supplied with base for floor mounting). Capacity: 75 lbs. per hr. 1/2 H.P. direct connected motor. Roller Bearings with Positive Seals. Screen with 1/16" opening.



DE MATTIA
CHUNK CUTTER

For low-cost salvage of larger slugs and chunks and molded pieces too tough for the average spine and scrap grinder. Capacity: over 150 lbs. per hr. 1/2 H.P. motor in base. Double V belt drive. Roller Bearings with Positive Seals.

BROSITES MACHINE COMPANY INC.

50 CHURCH STREET

[Cable Address—BROMACH]

NEW YORK 7, N. Y.

TELEPHONE: ELLIOT 9-3800

it possible to produce a completely laminated thermoplastic sandwich in 45 seconds.

Instron Engineering Corp. showed a new tensile testing instrument which will accurately measure and record load-elongation properties as well as relaxation effects.

Foremost Machine Builders, Inc., displayed a midget size waste granulator with a rated capacity in the neighborhood of 250 lb. per hour. Modern Plastic Machinery Corp. displayed a new type of electronic heating controller which is said to be capable of controlling the temperature of the molding material in an extruder barrel within very close limits. The control is of the electronic type but does not operate on the "on" and "off" principle.

The John Waldron Corp. exhibited a newly developed plastic embossing machine. It is completely self-contained and makes use of rotating radiant heating elements to soften the plastic web before it passes through the embossing rolls.

Preheater

A giant 15-kilowatt dielectric preheater was exhibited by W. T. La Rose & Associates, Inc. This machine has been designed so that it meets all requirements of the FCC regulations regarding this type of equipment.

The F. J. Stokes Machine Co. exhibited a new high-speed model automatic compression molding press. The press can be operated as fast as 12 complete cycles per min. and there is little if any danger of a double shot because of an ejection comb which strips the molded parts from the force plugs.

National Rubber Machinery Co. exhibited a 2 1/2-in. electrically heated extruding machine which features a fast-operating die adaptor gate for quick die and screen changes.

Industrial Ovens, Inc., showed a laboratory-size (24-in. web width) combination reverse roll, knife, and impregnation coating machine.

The Conference

A report on the conference sessions, held concurrently with the National Plastics Exposition, will be found on p. 154 of this issue. Also, for editorial comment on the implications inherent in the new developments in materials which were exhibited at the N.P.E., see p. 5.—END



injection moldings, too gain with the use of



TYPICAL INJECTION MOLDINGS made on
standard equipment using **PLIOVIC**
Goodyear's use-proved vinyl resin.

Toughness, superior oil-grease resistance and good aging characteristics mark injection moldings made with PLIOVIC—Goodyear's versatile vinyl resin. Typical examples are the luggage welting, furniture boot and automobile arm rest shown.

Compounders have found that PLIOVIC offers versatility of formulation—can be more highly loaded yet requires less plasticizer, compared with competitive resins. And PLIOVIC gives a wide range of bright color possibilities, at low cost, as well.

For full details see a Goodyear Chemical Division Representative today, or write:

Goodyear, Chemical Division
Akron 16, Ohio



THE FINEST LINE OF CHEMICALS FOR INDUSTRY

**a
Sure \$hot
for \$avings**



14 REASONS WHY PRECISION FINISHING COSTS LESS WITH THE NEW LIQUAMATTE

Mechanical equipment for producing close tolerance finishes has finally been perfected. "Hand" finishes are now produced mechanically in a matter of seconds in the new Liquamatté without the operating difficulties usually encountered in these processes. A simplified method of wet blasting, the new Liquamatté has 14 advanced design features that lower finishing costs.



Model 43 American Liquamatté Cabinet Equipped with an Accessory Rinse Tank, Car and Turntable.

The Liquamatté is easier to start and more convenient to operate. Work can be handled faster with less effort and with far less down time. As a result, the Liquamatté uniformly removes scale and grinding lines at a new low cost. It cleans tools, dies and molds with greater efficiency while holding tolerances of ".0001".

We believe the Liquamatté is the greatest advancement in close tolerance finishing in many years. We'd like the opportunity to prove it to you.



THE 14 WAYS the Liquamatté simplifies wet blasting are described in Bulletin 23. Send for your copy today.

American LIQUAMATTE
WHEELABRATOR & EQUIPMENT CORP. WET BLASTING
816 S. Byrkit St., Mishawaka, Ind.

Nylon

(Continued from pp. 101-8)

through the bottom of the vessel. A large number of small items are best handled by loading them into a wire basket equipped with a lid to prevent the nylon from floating, and immersing the basket in the bath for the required time. Slow cooling away from drafts should follow. The minimum immersion time required for heat-treating is 10 min. for articles having a wall thickness less than $\frac{1}{8}$ inch. Articles of heavier cross sections may require up to 30 minutes. A standard immersion time of 30 min. for all articles regardless of thickness can, of course, be used if desired.

Safety Precautions

Nylon is not a dangerous material to handle, provided it is recognized that it is very hot and very fluid in its molten state. The presence of moisture in the molten nylon does not make it more dangerous.

In general, molding powders heated to elevated temperatures in a confined space expand considerably and generate pressure which, when released, can cause molten material to be expelled from the cylinder with considerable force. Long delays in the molding cycle increase the possibility of violent ejection, particularly if the material in the rear section of the plasticizing cylinder is allowed to solidify due to a temperature drop, while the center and front sections are maintained at well above the melting point. This results in the formation of a solid plug of plastic backed by molten material under pressure. To prevent this from happening, the nozzle should be free from contact with the sprue bushing during the heating period prior to molding. The nozzle and front end of the cylinder should be heated first and maintained at a temperature at least 50° F. above the rest of the cylinder. As soon as the plastic flows from the nozzle, the remainder of the cylinder may be set to the proper molding temperature. When the rear temperature is sufficiently high to permit moving the ram, at least one air shot should be taken before locking the nozzle against the sprue bushing. The rear temperature of the cylinder should then be maintained high enough to allow free movement of material entering rear zone.—END

MOLDERS!!

'TEN-SHUN!!

Announcing....

DRYPLY

PRE-IMP

GLASS FIBER reinforced POLYESTER

MOLDING COMPOUND

For Compression and Transfer Molding
Usable on present Standard Equipment



NEW! BETTER!

Combines the exceptional chemical resistance of polyester resin with the high impact, physical strength, and heat resistance that only glass fibers can impart.

MADE of glass fibers uniformly pre-impregnated with polyester resin and cut to size ready for use in standard compression and transfer molding techniques.

WRITE, WIRE OR PHONE FOR DETAILS NOW!



Shelf Life
OR LONGER
at normal
room temperature

Flexfirm PRODUCTS

PRE-IMP DIVISION
2300 No. Chico Ave. • El Monte, Calif. • Cumberland 3-1173

EXTRUDERS

HARD XALOY-LINED CYLINDERS

HARD TO BEAT!

- Xaloy liners can be adapted to any extruding equipment.
- Xaloy liners have absolute uniform surfaces, depth hardness.
- Xaloy minimizes contamination.
- Xaloy liners give longer service.



INCREASE YOUR PRODUCTION! DECREASE YOUR COSTS!
• SPECIFY XALOY LINERS TO YOUR SUPPLIERS •



Learn How

FIBERPLAST

The Superior Phenolic Compound for Compression Molding

GIVES YOU MAXIMUM IMPACT STRENGTH PLUS MAXIMUM FLOW!

There's a Fiberplast material that is "just right" for your molding need! Whatever your problem, our laboratory will develop the exact Fiberplast compound that is specifically designed for your particular application.

Fiberplast combines selective fibers and phenolics to give you a superior molding compound with these outstanding features:

- Lower molding pressures
- Rapid cure
- Lustrous finish
- Choice of colors
- Heat and moisture resistant
- Special functional capabilities

Let our engineering staff tackle your particular molding problem. Write for full information, material specifications, testing data, or samples, if required.



Plastics Division

INTERNATIONAL TEXTILE CO.
2515 W. 18th Street, Chicago 8, Illinois
Cable Address: Incos

Exotherm Curves for Cold-Setting

(Continued from p. 124)

about 150° C. The stainless steel needle thermocouple described in reference 1 can readily be removed from the cured resin. The method described in reference 1 for determining gel time from the temperature curve is not applicable to room temperature cure and the gel time must be observed by periodically lifting the thermocouple. It is not easy to describe the state which is to be considered as gelled but it will usually be found that there are two distinct stages—first, where the resin suddenly ceases to flow smoothly from the thermocouple; and second, where the entire mass is just gelled. As the reaction is normally proceeding fairly rapidly at this stage, any indeterminacy in this time is usually insignificant. After gelation, there should be no disturbance of the resin by any further movement of the thermocouple.

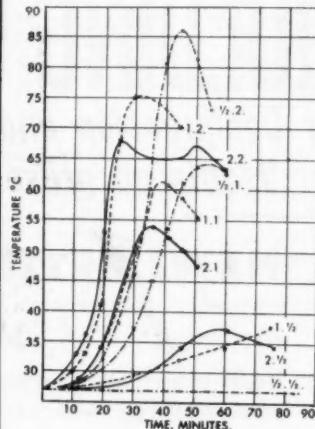


Fig. 1—Exotherm curves for Styrol 102E resin containing tert-butyl perbenzoate catalyst (first figure) and GE #3337 accelerator (second figure, in percent)

Since the entire test may be completed in a few minutes or may extend over 2 hr. or more, no attempt has been made to use a temperature recorder, though if an instrument

Miccrosol

A superior Vinyl Plastisol developed and manufactured to your specifications by MICHIGAN CHROME & CHEMICAL COMPANY.

MICCRSOL is specially formulated for a wide variety of coating applications as molding, dipping, etc. It is ideal for slush molding of toys and other suitable flexible objects; as well as a coating material for gloves, fabric, wire goods and packaging protection.

Our engineers will be glad to help you with your molding or coating applications. Write for consultation on your problem.

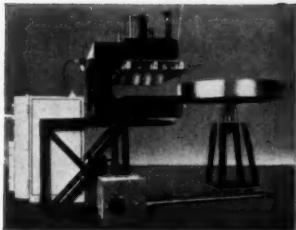
MICHIGAN CHROME & CHEMICAL COMPANY

6342 East Jefferson Avenue
Detroit 7, Michigan



special electronic sealers

by Mayflower



For Inflatables For Instance—

In one operation, this Mayflower designed press with 6 KW generator welds half the bottom of an inflatable pool. The direct electric resistance welds a half-turn and the other side of the pool is bonded. 36" and 48" units developed and built for U. S. Fiber & Plastics Co. Stirling, N. J.

Manufacturers with problems in the production of heat sealed plastics turn to Mayflower for solutions. Mayflower custom designs and builds hi-speed electronic sealers to do jobs no other sealers can. These machines, using famous Mayflower power generators, provide practical methods for mass production.

If you would like to simplify your electronic sealing of plastics and reduce labor and manufacturing costs, ask Mayflower for recommendations.



ayflower ELECTRONIC DEVICES
Inc.

Only Manufacturer of Both Bar and Rotary
Electronic Heat Sealers
6014 Hudson Blvd. West New York, N. J.

New... SIGHT FEATURE

the improved PREIS-PANTO Model UE-3 ENGRAVING MACHINE

- Saves precious eyes
- Easy to use
- Precision engraves even the finest work in plastics or metal, including steel.



With this improved machine the operator has full view of work. Well engineered construction insures utmost accuracy.

For long hard service and excellent work you can depend upon PREIS-PANTO ENGRAVING MACHINES and ACCESSORIES.



H. P. PREIS ENGRAVING MACHINE CO.
653 Route 29
Hillside, N. J.

Write for latest catalog.

"If you would know
The POWER
of the LABEL... go
to Ever Ready"

Anonymously

LABELS FOR PACKAGING

ADVERTISING, POINT OF PURCHASE

SPEEDWAY ADDRESS LABELS

MERCHANDISING

SHIPPING, CAUTION

IN ROLLS, SINGLE

DIE-CUT, EMBOSSED

Ask for FREE IDEA BOOK

Ever Ready Label Corp.

363 COSTLANDT STREET • BELLEVILLE • NEW JERSEY

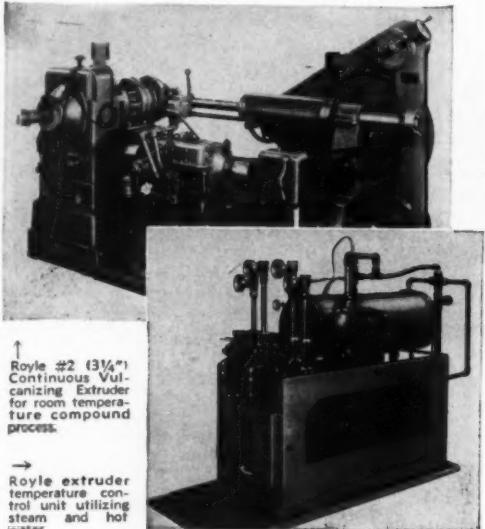
EVER READY LABEL CORP.
in a fast-changing world, with its
countless new products and by-
products, new problems of labeling
present themselves. At Ever Ready
we have ALL the answers... special
papers, special adhesives, special
formats. Heat-seal, Red-E-Silk pre-
sure sensitive, spot-gummed, strip-
gummed, carbonized. Cut single,
padded, in rolls. Background of a
million orders... over 50,000 cus-
tomers. Sure, we can put LABEL-
POWER to work for you, too!

Of Particular Importance

To the Wire Insulating Industry

The room temperature compound process and associated equipment recently developed by the Western Electric Company, Incorporated, offer nine important advantages. These advantages begin with the storage of completely mixed, ready-to-extrude, rubber, GR-S, or Neoprene compounds and extend to a smoother and improved appearance for the finished product.

The complete extruder vulcanizing portion of the room temperature compound process is available to insulated wire producers* from John Royle and Sons who, for seventy-two years, have been building extruding machines to meet the most exacting process requirements.



Royle #2 (3 1/4") Continuous Vulcanizing Extruder for room temperature compound process.

→ Royle extruder temperature control unit utilizing steam and hot water.

CHECK THESE ADVANTAGES:

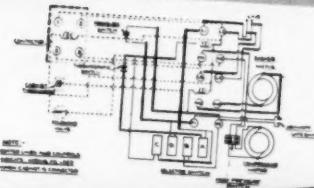
- Improved diameter control
- Reduction in compound scrap
- Reduction in electrical faults
- Permits storage of completely mixed compounds
- Permits more economical scheduling of mixing equipment
- Eliminates "warm-up" operation
- Possible mill-room economies
- "Hot" machines may be converted
- Finished product has smoother finish—better appearance

*Licensees of Western Electric Company

JOHN ROYLE & SONS

10 ESSEX STREET, PATERSON 3, NEW JERSEY

Forget Metal Shortages!



Give your **SCHEMATIC DIAGRAMS** the Advantages of **PLASTICS**

End the headaches of metal shortages for your schematic diagrams! Switch to plastics and you'll have perfect protection from soil and damage for your important instructions.

Sillcocks-Miller engineers are specialists in this precision work and can develop and produce diagrams made of plastics to your exact specifications. Write for details and quotations.

The SILLCOCKS-MILLER COMPANY

18 W. Parker Ave., Maplewood, N.J.

In Stock— SHEETS-ROLLS OR CUT TO YOUR ORDER

• Cellulose Acetate

All Thicknesses Up To .250 Clear Transparent, Matte, Opaque, Translucents - Colors. Sheets - 20x50", 25x40", 40x50", Or Cut To Any Size Or Shape To Fit Your Needs. Rolls 20" and 40" By Any Length.

• Plexiglas All Thicknesses

.060 To 3.000 Clear Transparent & Colors. Sheets 24x36", 36x60", 36x48", 40x50", 48x72"

• Vinylite .010 to .100 Clear Transparent, Matte - Colors. Sheets 20x50" Only

• Cellophane Sheets — Rolls — Ribbon — Cellulose Tape

TRANSILWRAP CO.

2814-18 W. Fullerton Ave., Chicago 7, Ill.

Dickens 2-2616



CAN SOLVE YOUR NAMEPLATE PROBLEMS!

FIRM: View-lex, Inc.

PRODUCT: Lite-O-Stat

PROBLEM: To eliminate breakage caused by molding instructions into plastic shell of Lite-O-Stat, yet retain legibility, neat appearance at low cost.

SOLUTION: Meyercord nameplate Decals eliminated *all* breakage—saved 48% loss of plastic shells, provided *more legible* instructions and neater appearance at the lowest possible cost.

Send Us YOUR Nameplate Problem

THE MEYERCORD CO., CHICAGO 44, ILLINOIS

FREE!



Write today for complete Meyercord nameplate manual Address Dept. 7-5

FASTER MOLD RELEASE 20% GREATER OUTPUT FAR LESS DOWN TIME



—when your molds are
**SUPER-POLISHED
BY ACME**

Acme's famous precision mold polishing process produces a flawless super-finish that insures faster mold release, increases production up to 20%, provides better finished products, saves time, cuts costs. Used by leading molders everywhere. Write for details NOW!

acme scientific company

manufacturers of optical flats and monochromatic lamps

1451 West Randolph Street • Chicago 7, Illinois

with a suitable chart speed were available, it would be extremely convenient. If a suitable thermocouple is not available, satisfactory results can be obtained using a ther-

mometer. If the thermometer is not to be irrecoverably embedded in the cured resin, it should be twisted at frequent intervals after gelation. The resin should not be disturbed by moving the thermometer in any other manner.

The determination is repeated varying the quantities of catalyst and accelerator over a range limited on the one hand by excessively long gel times and on the other by excessive vigor of reaction. The results will normally be presented in the form of a series of curves of temperature versus time.

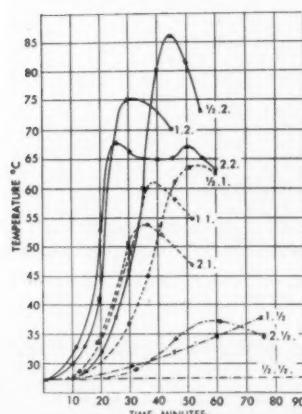
The resin-catalyst-accelerator systems in the following examples are used only to illustrate various effects. It is not intended to imply that these catalyst-accelerator systems are best suited to the particular resin or that any of the resin-catalyst-accelerator systems are those best suited for any particular application. Figs. 1, 2 are exotherm curves for Stypol 102E resin (2) with *tert*-butyl perbenzoate catalyst and GE #3337 accelerator (3). Curves are numbered to show the catalyst and accelerator percentages

by weight, the catalyst being stated first. Thus $\frac{1}{2}2$ means $\frac{1}{2}\%$ catalyst and 2% accelerator. The gel times for this system are enumerated in Table I.

Table I—Gel Times for Stypol 102E Resin

Amount of <i>tert</i> -butyl perbenzoate catalyst	Amount of GE #3337 accelerator	Gel time
%	%	min.
0.5	0.5	90
	1.0	19
	2.0	14
1.0	0.5	19
	1.0	13
	2.0	10
2.0	0.5	22
	1.0	12
	2.0	8

In Fig. 1 the curves have been arranged in groups of three with the catalyst concentration held constant in each group and the accelerator concentration varied. It will be noted that, in each group, increasing the



POLYESTER
CELLULOSE ACETATE
CELLULOSE ACETATE BUTYRATE
ETHYL CELLULOSE • POLYSTYRENE • NYLON
METHYL METHACRYLATE • POLYTHENE • POLYVINYL
POLYVINYL BUTYRAL • CELLULOSE ACETATE • CELLULOSE ACETATE BUTYRATE
ETHYL CELLULOSE • POLYSTYRENE • NYLON • METHYL METHACRYLATE
POLYETHYLENE • POLYVINYL CHLORIDE • POLYVINYL
BUTYRAL • CELLULOSE ACETATE • POLYVINYL
PROCESS IT
ACETATE BUTYRATE • ETHYL
CELLULOSE
POLY

PLASTIC SCRAP

WE BUY
SELL IT

Plastics Division:

H. MUEHLSTEIN & CO.

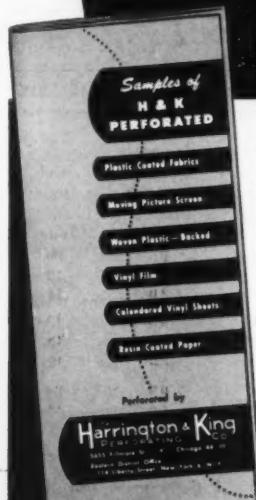
60 EAST 42nd STREET, NEW YORK 17, N. Y.

BRANCH OFFICES: Akron • Chicago • Boston • Los Angeles • Memphis

WAREHOUSES: Jersey City • Akron • Boston • Los Angeles • Memphis

ETHYL CELLULOSE • METHACRYLATE • CELLULOSE ACETATE • POLYSTYRENE • VINYL CHLORIDE • CELLULOSE ACETATE BUTYRATE • ETHYL

**The PERFORATING
of
PLASTICS**



This folder of perforated swatches includes samples of various forms of plastics available as coated fabrics, vinyl sheet and film, resin coated paper and woven plastic fibers—all perforated with various sizes and spacings of holes.

The perforating provides ventilation and air escape for upholstery, sound escape for moving picture screens, light transmission for advertising signs as well as for decorative and many industrial purposes.

With 68 years of experience we are prepared to meet the requirements of the plastic industry when perforating is required.

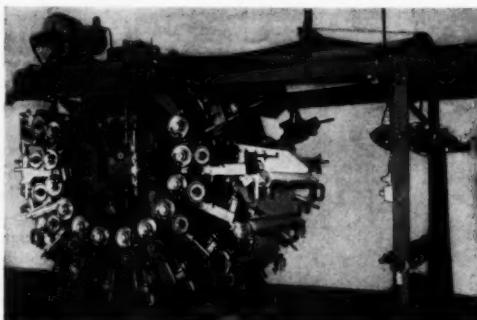
Send for this folder of samples gratis.

**The Harrington & King
PERFORATING
CO.**

5680 Fillmore St., Chicago 44, Ill.
114 Liberty St., New York 6, N. Y.

TWELVE COLOR LEMBO
surface printing machine
for vinyl and other plastic films

- Fully adjustable
- Accurate register
- Widths up to 80" and wider on order
- Repeats in patterns from 14" to 96"
- Complete specifications and prices on request



also manufacturers of rotogravure printing machines for 1 to 6 colors

Write for our new illustrated brochure

LEMBO MACHINE WORKS, INC.

248 East 17th St.

Paterson 4, N. J.

Manufacturers of Printing Presses and Cylinders

accelerator decreases the gel time and increases the height of the exotherm. In Fig. 2 the same curves have been arranged in different groups, this time with the accelerator constant in each group and the catalyst varied. Here it will be noted that increase in catalyst decreases gel time, but, contrary to what might be expected, also decreases the height of the exotherm. The peculiar double-peaked 2.2 curve has been verified by repeated determinations.

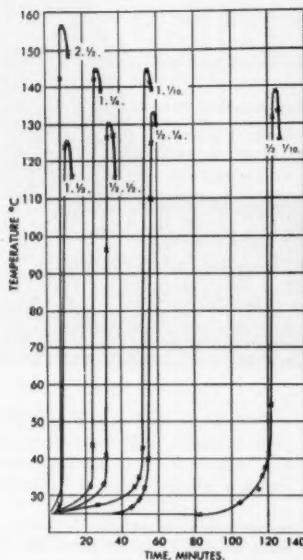


Fig. 3—Exotherm curves for Vibrin 103 resin containing talc (50% by weight), benzoyl peroxide catalyst (first figure), and Vibrin #3 promoter (second figure, in percent)

Fig. 3 shows similar curves for Vibrin 103 resin (4) with 50% by weight of talc filler using benzoyl peroxide catalyst and Vibrin #3 promoter (an amine type accelerator), gel times being listed in Table II. Although there is a wide variation in gel time over the useful range of concentration, there is little change in the maximum temperature attained.

Fig. 4 curves are for Marco MR-21C resin (5) 100 parts, talc 50 parts, styrene 10 parts, with Luperco ATC catalyst (6) (50% benzoyl peroxide in tricresyl phosphate), and Mar-

**SELF-CONTAINED
BAKER
AUTOMATICS**



1600 RESISTORS PER HOUR



International Resistance Corp.
Philadelphia, Pa.

Shown at left is type M-W Wire Wound Resistor molded by International Resistance Corporation with the Baker Automatic Compression Molding Machine. "We installed one of our standard 32 cavity molds, and are molding resistors with Alkyd 422 at the rate of 1600 parts per hour on the Baker," says Mr. E. J. Fitzpatrick, Manufacturing Engineer of I.R.C. "Cycle time is 40 seconds for machine time and 30 seconds for cure. Overall cycle is only 70 seconds." This application is typical of the many accomplishments of the Baker Automatic in the compression molding field.

CLOSURE... 400 inches per minute with ALKYD
ALSO SLOW SPEED FOR PHENOLICS, UREAS, MELAMINES

Baker Brothers invite comparison of their closure speed of 400 inches per minute, their large platen area and overall Alkyd cycle time of 4 seconds plus cure, or the phenolic cycle time of 12 seconds plus cure with any other machine on the market.

Actual records of specific parts show the Baker Automatic to be capable of multiplying production by as much as four times, and with lower initial investment due to the fewer die cavities required.

The machine is available from stock in both 15 ton and 30 ton models with 8 cavity feeder. Floor area 56" x 25" for either model.

Send for details now!

BAKER BROS., Inc., Toledo, Ohio
PROGRESS IN HEAVY MACHINERY SINCE 1873

PROGRESS IN HEAVY MACHINERY SINCE 1867

BAKER BROTHERS, INC.
TOLEDO, OHIO

Send more information on the Baker Fully Automatic Compression Molding machine to:

Many

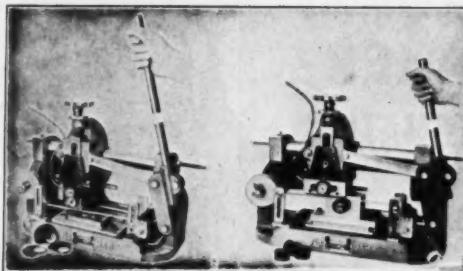
Title

111

Zone State

ACROMARK

No. 9AH HOT STAMPING MACHINES



These machines use a roll die to mark flat parts and flat dies to mark tubes and round parts. The motor driven models are the last word in high production plastic parts marking.

Write
for
Full
Details

The
ACROMARK
Company

5-15 MORRELL STREET

A
Trouble
free
Machine
ELIZABETH 4, N. J.



REPROCESSED

POLYETHYLENE

PELLETS
all colors and shades

CUSTOM WORK

On a custom basis, we will . . .

- ★ reprocess
- ★ compound
- ★ color
- ★ pelletize
- ★ extrude

any thermoplastic material

VINYL AND
POLYETHYLENE SCRAP
bought and sold

INDUSTRIAL PLASTIC & TEXTILE CO.

72 Woolsey St. Irvington, New Jersey

Phone: Essex 2-6616

Cable: INDUSTPLAS



co accelerator D (again an amine type). Gel times are shown in Table III. Here the maximum temperature attained is highly dependent on catalyst concentration, increasing with increase in catalyst but largely in-

restricted range over which it is practicable to make observations or differences caused by the unknown constituent, the inhibitor.

In any production application of cold-setting polyester resins, it almost invariably happens that it will periodically be desirable to make variations in the proportions of catalyst or accelerator to compensate for variation in resin batches, seasonal variations in ambient temperature, etc. Curves such as these indicate in which direction these changes should be made in a particular system. However, a study of the few curves shown discloses many other points of practical interest. Consider three different types of applications: 1) making a large casting with troublesome inserts, 2) making a large number of small simple castings, and 3) laying up an intricate glass cloth polyester assembly. In the first case, in order to avoid setting up excessive strains with the possibility of cracking, a long, gentle, and readily controlled exotherm without an excessively long gel time is required, such as is obtainable, for instance, with the

system shown in Fig. 1. The second case, however, calls for a short gel time followed by a vigorous exotherm to allow release of the molds

Table III—Gel Times for Vibrin 103 Resin Containing Talc Filler (50% by weight)

Amount of benzoyl peroxide catalyst	Amount of Vibrin #3 promoter	Gel time
0.5	0.1	89
	0.25	46
	0.5	25
1.0	0.1	49
	0.25	23
	0.5	7
2.0	0.5	6

dependent of accelerator concentration. These results are sufficient to show the unpredictability of the effect of catalyst and accelerator concentrations. This apparent lack of order is presumably due to either the

Amount of Luperco ATC catalyst ^a	Amount of Marco D accelerator	Gel time
1	1	96
	2	48
	4	31
	2	46
4	1	29
	2	13
	4	5

^a Luperco ATC is 50% benzoyl peroxide in tricresyl phosphate.

in the shortest possible time, calling for such a system as that in Fig. 4 using the higher concentrations of

IMPORTANT ANNOUNCEMENT

**to companies
that sell to the
plastics field**

Advertising space
reservations are now
being accepted for the
1952 Modern Plastics
Encyclopedia.

The new edition, to be
published in September,
will be circulated
to the full audience of
Modern Plastics magazine.
For complete details
and rates write to

Advertising Department,
Plastics Catalogue Corp.,
575 Madison Avenue,
New York 22, N. Y.

NEED

Plastics
FAST?



Call

Cadillac!

Townsend 9-9500

We pride ourselves on serving customers fast! In fact, our business has been built on just such service.

If your requirements call for plastics—and you need them in a hurry—give us a call! We can supply you with plastics, dyes and adhesives for re-use or fabrication, and in quantities to fit your needs . . . promptly and at low cost.

Inventory price lists for No. 1 and No. 2 grades on request.

AMERICA'S LARGEST WAREHOUSE STOCKS
PLEXIGLAS • VINYL • LUCITE
ACETATE • OTHERS
SHEETS • RODS • TUBES

Cadillac Plastic Co.

15117 Second Blvd., Detroit 3, Michigan

NEW VINYL FOAM PLASTISOL

- no pressure required — is atmospherically expanded with heat
- can be foamed to shape in place or in continuous lengths
- highly resistant to most solvents, acids and oils
- does not oxidize — may be made flame resistant
- with primer, can be bonded to almost any surface
- its unicellular structure retains resilience under ordinary conditions

Interchemical Corporation does not make foamed vinyl—just the plasti-sols for producing it with a wide range of characteristics. Technical Bulletin and sample of foamed vinyl available on request.



Interchemical Corporation
Finishes Division

52 WEST 44th STREET, NEW YORK 18, N. Y.
A COMPLETE LINE OF INKS FOR VINYL PRINTING

M.M. plastic granulator



In today's market the use of every available piece of scrap has become increasingly important. The M & M Plastic Granulator designed for "on the job grinding" can turn the material from your scrap barrel into usable granules and extra profit. Investigate today!

mitts & merrill

1016 South Water • SAGINAW, MICHIGAN

catalyst. In the last case, a long pot life to give sufficient time for lay up, preferably followed by a sudden reaction, is required, e.g., such as is given by the lower concentration of catalyst in Fig. 4.

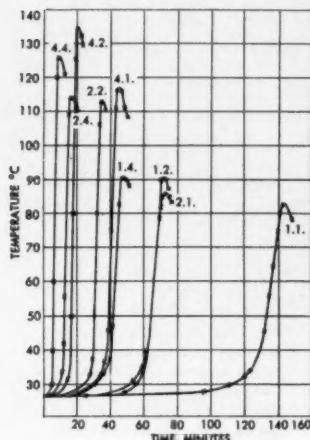
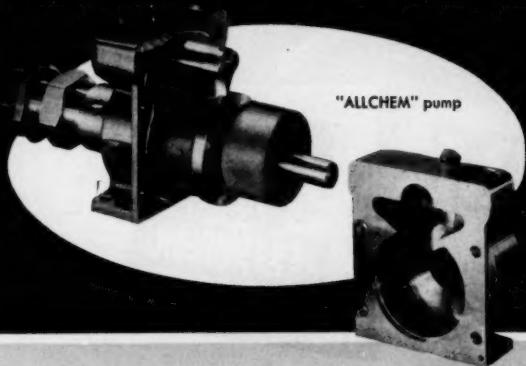


Fig. 4—Exotherm curves for Marco MR-21C resin containing styrene (10 parts), talc (50 parts per 100 parts resin), Luperco ATC catalyst (first figure), and Marco D accelerator (second figure, in percent)

A very interesting system is illustrated in Fig. 5. The producers of Selectron resins (7) supply an additional component for cold-setting systems. In spite of its name, promoter 5923, this material is a phenolic type inhibitor. The curves shown have been carefully selected to illustrate the effect of this component, since apart from the interest of this system itself, it gives an indication of the type of effect inhibitors added by the manufacturer can produce. In Fig. 5 the gel times are indicated by the arrows on each of the various curves.

Curve I shows the effect of 2% cyclohexanone peroxide catalyst, 2% Selectron accelerator 5901 (cobalt drier type), and 1% promoter 5923; the gel time was 17 min. and the exotherm had passed its peak and the resin was hard in 27 minutes. With the other components constant but 2% promoter 5923, Curve II shows that the gel time increased to 53 min. while the exotherm peak was passed at 65 minutes. In Curve

"Engineered Fluorocarbons" MADE THIS CHEMICAL PUMP POSSIBLE



Impellers, bearings, packing of Chemelac Mixtures (TEFLON®-PLUS) are impervious to chemicals and are non-contaminating, minimize friction, maintain high efficiency.

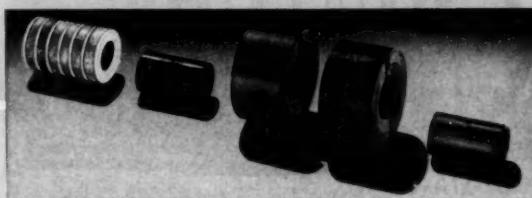
Eco Engineering Company of Newark, New Jersey, makes this "ALLCHEM" pump, suitable for pressures up to 70 lbs., at 3400 R.P.M., for pumping anything that glass can handle—acids, alkalies, solvents, oils, pharmaceuticals, biologicals—with-out chemical attack contamination.

Chemelac Mixtures are duPont Teflon to which another material has been added in its fabrication to impart some characteristic which the pure fluorocarbon does not possess.

These Teflon "alloys" offer an al-

most limitless series of new materials for the designing engineer. Bring us your problem and we will work with you to determine the Chemelac Mixture best suited to your requirements of hardness, wear resistance, dimensional stability, chemical resistance, anti-friction qualities, dielectric or conduction qualities, permanent magnetism, resistance to neutron bombardment, etc.

Also, there are metal surfaced materials which may be soldered to, and materials which are cementable.



**UNITED
STATES
GASKET
COMPANY**

**FLUOROCARBON
PRODUCTS DIVISION**
FABRICATORS OF "TEFLON", "KEL-F"
AND OTHER FLUOROCARBON PLASTICS
CAMDEN 1, NEW JERSEY

*duPont's trademark for its tetrafluoroethylene resin



COMPRESSION
INJECTION
EXTRUSION
FABRICATION

MICHIGAN MOLDED PLASTICS, INC.

Plant and General Offices: DEXTER, MICHIGAN

Sales Offices:
DETROIT
BUFFALO

ELYRIA, OHIO
PHILADELPHIA
MINNEAPOLIS

ST. LOUIS
MILWAUKEE
CHICAGO

MOLINE, ILL.
SOUTH BEND
LANSING



Courtesy Dale Plastics Corporation, Detroit, Michigan

DE-STA-CO Toggle Clamps speed production on this simple, efficient wood turntable fixture for volume cementing of plastic fish-net floats. Twenty-four Model 210-U clamps are used to obtain quick clamping pressure. The rugged construction of De-Sta-Co clamps has permitted continuous use for over 2½ years producing 240 to 300 floats per hour. Completely retractable, they permit easy insertion and removal of work. De-Sta-Co's positive clamping pressure on the float parts makes a perfect bond and accurate assembly.

Select from over 40 models of De-Sta-Co Toggle Clamps for your work-holding problems in assembly, welding, bonding, machining or inspection of any materials. Positive holding pressures up to 4000 pounds.

Write today for your copy of the De-Sta-Co Toggle Clamp Catalog describing more than 45 stationary and portable types.



DETROIT STAMPING COMPANY

327 Midland Ave. • Detroit 3, Mich.

III the promoter has been omitted and the catalyst and accelerator concentrations adjusted (to $\frac{1}{2}\%$ and $\frac{1}{10}\%$ respectively) to give approximately the same gel time as in Curve I. It will be observed that

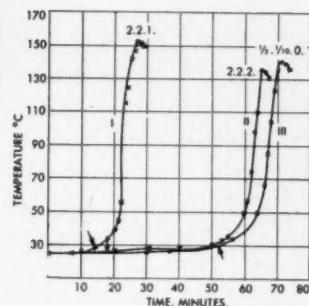


Fig. 5—Exotherm curves for Selectron 5003 resin containing cyclohexanone peroxide catalyst (first figure), Selectron 5901 accelerator (second figure), and Selectron 5923 promoter (third figure in percent). Gel times are indicated by arrows

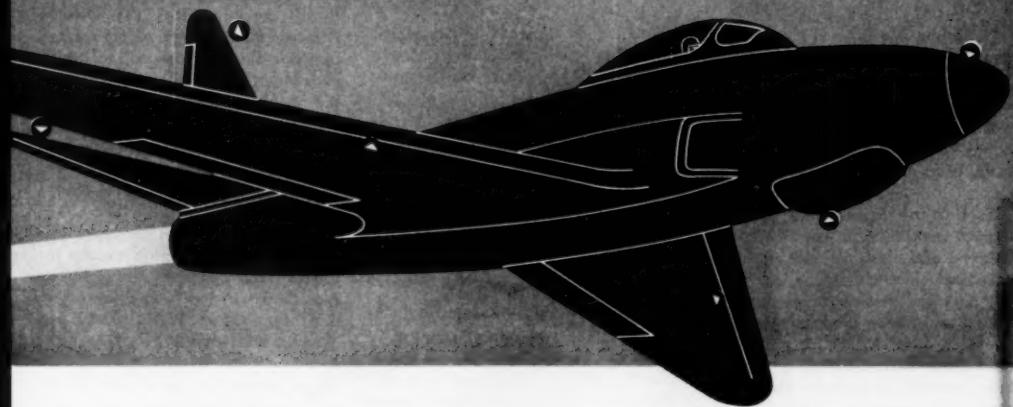
the peak exotherm occurred at about the same time as in Curve II. In other words, if a gel time of 17 min. is required, it is possible, by adding this inhibitor, to obtain substantial cure in 25 min. instead of 65 minutes. Alternatively, if substantial cure is required in 65 min., it is possible to extend the pot life from 17 to 53 minutes.

While it is obviously impossible to make quantitative deductions regarding the temperature build up in a production casting from a small laboratory sample, the examples given show how useful an exotherm curve can be both in choosing a suitable polymerization system and in controlling it during production.

References

1. The proceedings of the Sixth Annual Technical Session, the Reinforced Plastic Division, Society of the Plastics Industry, Inc., New York, N. Y. (1951).
2. H. H. Robertson Co.
3. Chemical Div., General Electric Co.
4. Naugatuck Chemical, Div. U. S. Rubber Co.
5. Marco Chemicals, Inc.
6. Lucidol Div., Novadel-Agene Corp.
7. Pittsburgh Plate Glass Co.—END

Choice of Leading Manufacturers of Reinforced Plastic Aircraft Parts...



PARAPLEX P-43

For high-strength, uniform molded aircraft parts, important producers—such as Zenith Plastics Company and Swedlow Plastics Company—choose PARAPLEX P-43. Swedlow fuel cell backing reinforces self-sealing gas tanks for added safety. Zenith parts protect indispensable radar equipment, provide strong, streamlined leading edges, nose sections, tail assemblies.

Reasons for the choice:—Reinforced plastics based on PARAPLEX P-43 resin show consistently high physical properties; and PARAPLEX P-43 is easy to handle in production schedules.

If you manufacture reinforced plastics for military or civilian use, you'll want to test PARAPLEX P-43. Send for free technical data.



PARAPLEX is a trade mark, Reg. U. S. Pat. Off.
and in principal foreign countries.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

Representatives in principal foreign countries

THE PLASTISCOPE*

NEWS AND INTERPRETATIONS OF THE NEWS

By R. L. Van Baskirk

Rubber-Modified Styrene

THREE new formulations of Bakelite styrene modified with rubber, which give strength to molded parts with thin cross sections and can also be extruded in thin tough sheets, have been announced by Bakelite Co.

Each of the three grades has high impact resistance, is easy to mold, extrude, and machine, and combines excellent electrical properties with the chemical resistance of styrene. The three grades have been designated as QMS-151, -152, and -155. Each grade varies slightly in the degree in which it includes the properties. For example, QMS-155 has the highest impact strength and QMS-151 the best moldability.

Extruded in sheets about 0.025-in. in thickness, QMS-155 is tough and flexible. Such sheets are easy to post-form, swedge, or blow to large shapes such as refrigerator trays. They can be made in many colors with a mat finish or press polish, and they take printing easily.

Extruded tubing made from this material has proved that it will stand the impact of a 1-lb. ball dropped nearly 80 in. onto the tubing at 32° F. Squeezed in a vise, 0.8-in. diameter tubing with a wall thickness of 0.125 in. withstands a reduction of 70 to 80% in the jaw opening without cracking even down to -5° F. Such tubing can be machined and threaded on the job. One hundred ft. of 1-in. pipe made of this rubber-modified styrene weigh only 14 lb., as against 168 lb. per 100 ft. for galvanized steel pipe of the same size.

Extruded in other shapes, the same high impact materials make tough, rattan-like strips or strong wall moldings. The rattan-like extruded strips are woven into flexible chair seats that combine superior strength with a smooth surface and color.

QMS-151 has been used to make white refrigerator door liners of 30

* Reg. U. S. Pat. Off.

by 48 in. in dimension that weigh only 5½ pounds. Battery cases weighing 13 oz., refrigerator frames, and toys that resist children's rough usage have been injection molded from these materials.

All three grades of the material can be injection molded in conventional molding equipment. The new materials retain their toughness at -5° F.

Vinyl Latices

FIRST in a series of new vinyl resin latices being produced commercially by the Goodyear Tire & Rubber Co., Akron, Ohio, has been introduced to the textile and paper coating industries. Known as Pliovic Latex 300, the new product is described as an aqueous dispersion of a vinyl chloride copolymer and is manufactured by a Goodyear subsidiary, Pathfinder Chemical Corp., Niagara Falls, N. Y.

Fabrics and paper coated with the material have resistance to grease, chemicals, and moisture, and their physical properties are improved.

Other uses for the vinyl latex are as pigment binders for inks and paints, as a sizing for textiles, and as binders for non-woven fabrics and also for felt.

Toy Show

IN view of the significance of the toy industry to the plastics industry, it is interesting to note that the Toy Manufacturers Association is quoted as stating that one-fourth of its members are offering price cuts from 1951. The cuts range from 3 to 10 percent.

In talking about the inventory situation, one of the variety chain store buyers said that he expected business to be good this year but he was not stocking up in advance. He said his company would order all year on a fill-in basis.

A department store chain executive said all of his buyers were at the fair in force but would only

place orders for spring. He said there would be no repetition of that six-months storage problem that existed last year.

A most interesting development that would concern plastics molders is that nearly all toy producers have expanded their lines to include more items. The big A. C. Gilbert Co., for example, expanded its line by 20 percent. Ideal Toy Co. increased the number of its models by one-third. Because of these broader offerings all along the line, the country's biggest toy wholesaler has put off ordering a month or two beyond the usual date to allow time for studying all the goods available.

New Vinyl Film Section

MANUFACTURERS of vinyl film under 10 mils were recently invited by the Plastic Coatings & Film Association to join a new section of that organization. PCFA, which has been in existence since 1927, up to now represented only manufacturers of pyroxylon coated fabrics, vinyl coated materials, and vinyl sheeting 10 mils thick and over. Membership in the proposed Film Section will be restricted to manufacturers of vinyl film under 10 mils, but will include membership in PCFA as a whole.

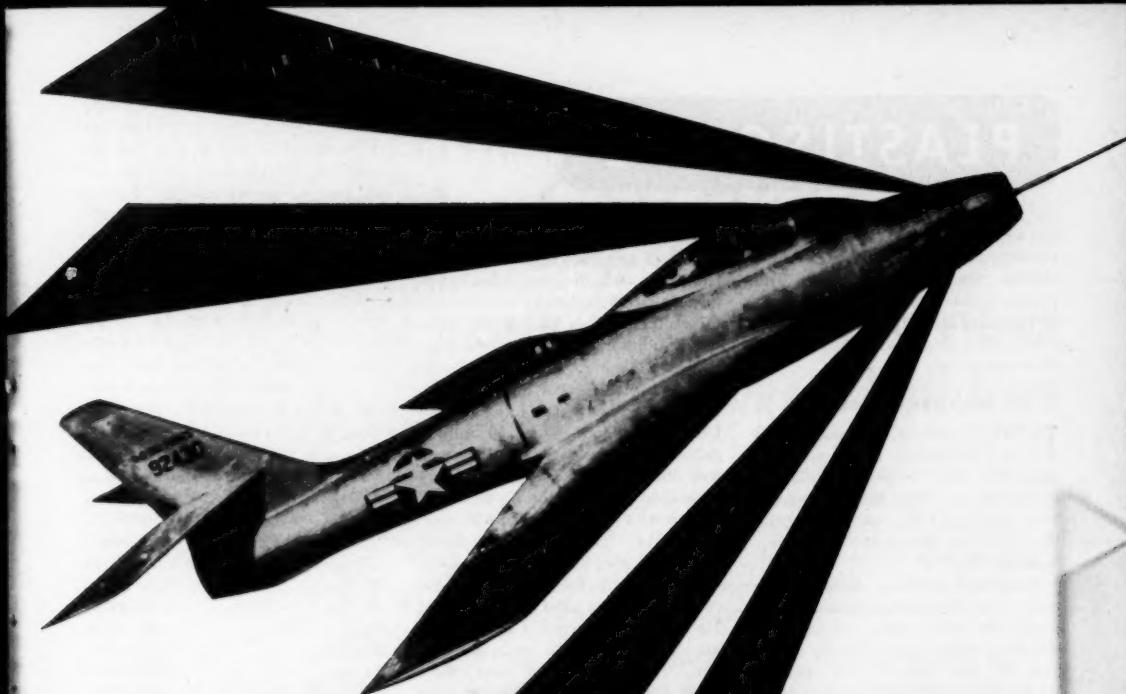
Polyethylene Exhaust Systems

EXHAUST systems for corrosive vapors and fumes are now being fabricated from polyethylene by American Agile Corp., P. O. Box 168, Bedford, Ohio. These systems offer corrosion resistance against most acid fumes, including hydrochloric, hydrofluoric, sulfuric, and nitric acids. In addition, they are easy to clean, require no other maintenance, and will outlast most other construction materials when used at temperatures between -20° and 170° F.

The installations, including tanks or tank liners, exhaust hoods, fume ducts, and fume stacks, are built to customers' specifications.

New Solvent

DIMETHYL acetamide, also known as acetyl dimethylamine, is a new polar type molecule useful in a wide variety of solvent applications, according to the manufacturer, Monomer-Polymer, Inc., 511 Lancaster St., Leominster, Mass. These applications include use with inorganic salts and inorganic gases, for recovery of ole-



VISIBILITY



by Swedlow

in the F-84F Thunderjet

Tremendous speed and terrific hitting power make the Republic Aviation Corporation's F-84F Thunderjet a formidable addition to the U.S. Air Force's new jet fighting team. The optical properties of its Swedlow-made transparent enclosures contribute to the efficiency with which this versatile fighting machine can perform in action.

With duplicated facilities in California and Ohio, Swedlow brings to the production of today's speedier aircraft, where precision more than ever counts, ten years of specialized experience in the precision engineering and production of astrodomes, canopies and other acrylic parts.



LOS ANGELES, CALIFORNIA • YOUNGSTOWN, OHIO

PLASTISCOPE

fins and acetylenic constituents of gas streams, and as a solvent for other plastics and natural resins. The solvent is able to dissolve easily some of the more difficultly soluble polymers, such as polyacrylonitrile and its copolymers.

Imports and Exports

TOTAL imports of chemicals used in the production of plastics raw materials and exports of plastics materials in 1951 were generally well ahead of 1950, with the exception of a few things such as naphthalene imports.

Naphthalene was perhaps the most surprising in the amount of imports that were made available to domestic users. In the middle of the year it was feared that imports would drop to almost zero, and insofar as the previous chief exporter—United Kingdom—was concerned, they did, since none came in from the United Kingdom after April. But

large imports running all the way from 1 to 4 million lb. a month from Germany and Belgium after April made a sizable quantity available in this country even though the total was 35 million lb. less than the year before.

Most of the benzol imported into this country last year came from the United Kingdom—some 50 million gallons. A little over 5 million gal. was obtained from Belgium, almost 10 million gal. from the Netherlands, and about 2 million gal. from France.

One of the surprising things shown by the figures is that after being cut off from Iron Curtain country imports after February and March, material from Czechoslovakia started coming in again in October, November, and December. Over 1½ million lb. of naphthalene were imported from Czechoslovakia in those months, and over ½ million gal. of benzol in December.

Exports of chemicals used in plas-

tics manufacture were surprisingly large in 1951 in view of the shortage that existed for more than half the year. The largest quantity of phenol shipped out of the country went to Canada—a total of more than 9 million pounds. The United Kingdom got almost 3 million lb. and the Netherlands got 2.2 million pounds. Leading importer of phthalic anhydride was Canada with 2½ million lb.; the United Kingdom got 1.9 million lb.; and Argentina a little over 1 million pounds. The largest portion of the formaldehyde shipments went to Canada.

Leading vinyl importers of material from the United States were as follows:

Canada	8,700,000 lb.
Brazil	4,700,000 lb.
United Kingdom	3,600,000 lb.
Mexico	3,300,000 lb.
France	2,300,000 lb.
Italy	2,000,000 lb.
Argentina	1,500,000 lb.
Japan	1,400,000 lb.
Philippine Republic	1,300,000 lb.
Cuba	1,000,000 lb.

No other country imported as much as 1 million pounds. This figure includes vinyl resin, vinyl compound, vinyl film and sheet, and there is no way of breaking them down into each category.

Leading polystyrene importers were:

Canada	8,200,000 lb.
France	3,000,000 lb.
Brazil	2,000,000 lb.
India	1,600,000 lb.
Belgium	1,300,000 lb.
Mexico and Australia	imported almost 900,000 lb. each, but no other country was anywhere near 1 million pounds.

Urea and melamine importers were:

Canada	7,300,000 lb.
Brazil	2,600,000 lb.
Mexico	1,500,000 lb.
Philippine Republic	1,000,000 lb.
No other country imported as much as 1 million lb. during the year.	

France and Canada each imported a little over 1 million lb. of cellulose acetate molding material. No other country imported more than 650,000 pounds.

Leading importers of vulcanized fiber were the United Kingdom with almost 3 million lb.; Canada with 2 million lb.; and Brazil with 1 million pounds.

Leading importers of cellulose

Imports and Exports of Plastics and Raw Materials Used in the Plastics Industry

	1950	1951
IMPORTS (In pounds unless otherwise stated)		
Benzol (gal.)	23,290,063	68,072,723
Cresylic acid	3,487,411	4,024,570
Naphthalene, solidifies at under 79°	110,800,026	74,445,274
Naphthalene, solidifies at over 79°	1,427,704	3,411,163
Phthalic anhydride	1,368,508	203,210
Cresol, all types	1,270,512	840,926
Hexamethylene tetramine	20,341	678,308
Vinyl acetate, unpolymerized	3,835,770	6,883,843
Vinyl acetate, polymerized	291,197	3,302,014
Cellulose acetate sheets	80,700	162,474
Cellulose acetate block, rod, etc.	133,354	415,536
Synthetic gums and resins ^b	372,185	156,259
EXPORTS		
Phenol or carbolic acid	14,049,467	19,720,111
Cresylic acids and cresol	2,962,806	5,072,108
Phthalic anhydride	2,802,333	9,236,387
Formaldehyde	23,517,998	28,889,540
Polystyrene	26,450,830	26,623,277
Vinyl chloride (includes film and sheet as well as compound)	31,640,228	42,305,721
Urea and melamine	11,877,592	17,351,434
Cellulose nitrate sheets	537,126	414,669
Cellulose acetate molding material	5,778,511	6,589,610
Cellulose acetate sheets	953,132	1,126,270
Vulcanized fiber sheets	5,885,114	9,482,787
Synthetic gums and resins, except laminating	12,894,317	14,246,609
Synthetic gums and resins, laminating	516,086	1,222,470

^a Source: United States Imports and Exports of Merchandise for Consumption, by Bureau of the Census.

^b This figure includes acrylic, nylon, polyethylene, silicone, urea and melamine and non-coal tar alkyl resins, and vinyl resins except vinyl acetate.

YOU'LL GET BETTER

Flex-Appeal

IN YOUR VINYL PLASTIC FILMS
WITH *Baker Plasticizers*

The ideal plasticizer should impart flexibility that persists over a wide range of temperatures. It should give film pliability, softness, drape, or hand at all times. To an outstanding degree the plasticizers listed below impart these qualities to polyvinyl chloride type resins. They give flexibility that is particularly effective at subzero temperatures.

And these Baker plasticizers offer a *plus* value. They are effective processing aids, acting as anti-stick agents during calendering operations. The hot PVC films are readily released from the rolls, making a high production rate possible.

PRODUCT	CHEMICAL NATURE	SPECIFIC GRAVITY 25°C/25°C	VISCOOSITY (Poises) 25°C	ACID NO.
RICINOLEATES				
Flexircin P-4	Methyl Acetyl Ricinoleate	.937	.22	2.2
Flexircin P-4C	Methyl "Cellosolve" Acetyl Ricinoleate	.960	.24	2.8
Flexircin P-6	Butyl Acetyl Ricinoleate	.928	.23	2.2
Flexircin P-8	Glyceryl Tri (Acetyl Ricinoleate)	.967	.23	2.0
PG-16	Butyl Acetyl Polyricinoleate	.913	.21	2.6
ACETOXYSTEARATES				
Paricin 4	(Methyl Acetoxystearate)	.934	22	2.4
Paricin 6C	(Methyl "Cellosolve" Acetoxystearate)	.953	32	3.6
Paricin 6	(Butyl Acetoxystearate)	.924	32	4.0

ESTABLISHED
1857

THE Baker CASTOR OIL COMPANY

120 BROADWAY, NEW YORK 5, N. Y.

LOS ANGELES • CHICAGO

THE BAKER CASTOR OIL COMPANY
120 Broadway, New York 5, N. Y.

Please send Technical Bulletin on
Baker Plasticizers.

Name _____

Title _____

Firm _____

Address _____

PLASTISCOPE

acetate sheet were Canada with 700,000 lb. and Mexico with 122,000 pounds. No other country imported more than 26,000 pounds. The same two countries were the leading importers of cellulose nitrate sheet with 206,000 lb. going to Canada and 51,000 lb. to Mexico.

First Honor Award Presented

THE Washington Chapter of the American Institute of Chemists presented its first annual Honor Award on April 22 to Dr. Gordon M. Kline at a dinner at the Roger Smith Hotel in Washington, D.C. Dr. Kline is internationally known for his researches in organic plastics, polymerization of olefins, dopes for aircraft, and adhesives. He is technical editor of *MODERN PLASTICS* and editorial director of "Modern Plastics Encyclopedia and Engineer's Handbook."

Government Procurement Manual

REVISED edition of the Government Procurement Manual has been announced by the Department of Commerce. The manual lists 5000 items and classes of items for which federal agencies are in the market, and contains a military agency and a civilian agency index, together with a listing of the locations of the appropriate procurement offices. The manual is being placed in Department of Commerce Field offices throughout the country and in local Chambers of Commerce where it can be consulted by businessmen interested in obtaining government contracts. Copies will also be distributed to all the principal purchasing offices of the military and civilian agencies.

Fluorocarbon-Glass Tubing

COMPLETION of development work on Teflon-impregnated fibrous glass tubing has been announced by Resistoflex Corp., Belleville, N.J. This construction, it is claimed, for the first time makes available the properties of Teflon in a thin wall tubing.

Both materials have good resistance to heat and chemicals. The Teflon makes the tubing suitable for

use with virtually every known chemical; the glass reinforces the structure to provide rigidity and strength in tubing with wall sections as thin as 0.030 inches.

Resistoflex is now prepared to produce this tubing on a pilot plant basis, on order, in various diameters and with thin to thick walls. It is expected that the chemical, thermal, and electrical properties of the tubing will answer many problems in chemical processing piping; corrosion-proof conduit; electrical coil forms; and in other electrical and electronic applications.

Polyester Preform Molding

A SET-UP to expedite research and development problems for polyester preform molding has been provided in the Milwaukee Research Laboratory of its Paint Div. by Pittsburgh Plate Glass Co. The new preform laboratory is also being used to find the solution to customer preforming problems in instances where the fabricator involved does not have the necessary equipment to thoroughly explore his own preforming techniques. Dr. Howard L. Gerhart, director of research, says the company does not plan to manufacture preforms for sale even on a limited scale. The basic function of the new laboratory will be research and development procedures pertaining to Selectron molding techniques.

New Plasticizers

TWO more new plasticizers have recently been announced by Rohm & Haas Co., Philadelphia, Pa.

One, designated Monoplex S-38, is a new, inexpensive, primary monomeric vinyl plasticizer of low volatility. It may be employed as the sole plasticizer as well as in blends with the Paraplex plasticizers and in compounds containing both low-cost secondary plasticizers and extenders.

Because of its rather dark color, Monoplex S-38 is generally suitable for only filled and pigmented compounds. As a primary plasticizer for such materials, it offers considerable formulating economies and is

recommended for use in pocketbook stocks and in gasket compounds, flooring, extruded molding, welding, and jacket stocks. Initial studies on stability indicate that Monoplex S-38 responds satisfactorily to stabilization by lead compounds. When lead silicate is added, stability tests at 325° F. show no change in flexibility of the compound during a 45-min. cycle.

The other plasticizer is Monoplex S-71. It is a low-cost material, light and clear in color, of low volatility and viscosity, and able to impart low brittle point values. Monoplex S-71 closely parallels Monoplex DOS (dioctyl sebacate), but it is less expensive and increases the stability of vinyl resins under heat and light. It is recommended for practically all types of vinyl end uses.

Monoplex S-71 finds its greatest use in stocks in which it comprises up to 50% of the total plasticizer concentration, and is particularly effective in blends with polymeric plasticizers.

Of equal importance to its ability to reduce bend brittle temperatures is the stabilizing influence of Monoplex S-71. Stocks containing Monoplex S-71 are highly resistant to deterioration by heat and light, and for that reason it is particularly recommended for use in film processing where high initial temperatures often cause severe discoloration.

Tin Salt Stabilizer

DESIGNATED OM-10, a new organo-tin salt is the latest stabilizer to be produced by Advance Solvents & Chemical Corp., 245 Fifth Ave., New York, N.Y. It was developed particularly to give an organo-tin stabilizer which would have less volatility and odor at high temperature processing, particularly in the rigid types and where low amounts of plasticizer are used. It is also recommended for straight polyvinyl chloride resin with DOP as a plasticizer. Heat stability is not quite as good as other Advance stabilizers but, on the other hand, OM-10 gives greater light stability.

Stabilizer OM-10 is particularly useful for transparent and crystal clear vinyl stocks, and has been successfully used in pressed-polished vinyl sheets. The company suggests use of from 1½ to 3% based on the resin. Where light resistance is the main objective and

plastics
meet
special
need
of
Television
Manufacturer



**BONNET FOR TELEVISION SET
MADE IN ONE-SHOT MOLDING
WITH RUGGED, SHOCK-RESISTANT**

STYRON 475



*Let's work it
out together*

Dow firmly believes
that three heads are better than one. Our
Plastics Technical Service will work closely
with you and with your customers to reach
the right plastics solution to your problem.

the ability to be molded in one operation. One-piece molding saved handling and assembly operations, cut costs all down the line.

The numerous advantages of Styron 475, and its *immediate availability*, may help you, too, solve a production bottleneck. *Write today!*

THE DOW CHEMICAL COMPANY

Plastics Department PL128

MIDLAND, MICHIGAN

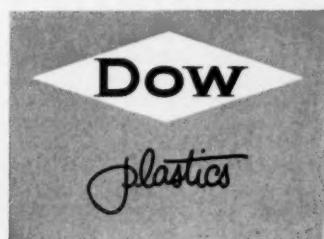
New York • Boston • Philadelphia • Atlanta • Cleveland
Detroit • Chicago • St. Louis • Houston • San Francisco
Los Angeles • Seattle
Dow Chemical of Canada, Limited, Toronto, Canada

This particular problem was faced by a prominent television manufacturer: how to protect the end of the television tube which projected from the back of the cabinet. The material to be selected had to be unusually strong and needed excellent electrical properties. Working with the molder and with Dow's Plastics Technical Service, the designers decided on Styron 475 (Dow polystyrene) as the material best able to do the specific job. This basic raw material had the qualities sought plus

The Styron label is the hallmark of quality in plastics goods.



STYRON brand plastics . . .
basic raw materials
serving basic industries



PLASTISCOPE

other stabilizers are used, as little as $\frac{1}{2}$ to 1% gives good results. It has been successfully used in extruding rigid vinyls; from 2 to 5% is suggested as a starting point for this purpose.

Stabilizer OM-10 is also effective with plastisols and organosols where films of high clarity and transparency are desired.

Cast Polyester Sheet

TRADE reports indicate that Pittsburgh Plate Glass Co. will soon announce a new Selectron cast sheet made from polyester resin to be produced in its recently built new plant. It is claimed that the aircraft industry is already using cast sheet made from this material in civilian airplane windows. The new material supposedly does not craze, and abrasion is low so that ordinary cleaning materials can be used. It is understood that the company will sell cast polyester sheet only, and in stock sizes. There will be no attempt by Pittsburgh Plate Glass Co. to fabricate the sheet into end products.

Molded Shoe

ONE-PIECE slush molded thermoplastic shoe from Germany is now in the hands of a shoe company in the United States and is being evaluated as to its possible practicability in the footwear field. This department has no further information as to producer or materials used other than the above statement.

Small Business

THE Annual Report of the Select Committee on Small Business of the United States Senate has this to say about the plastics industry:

"Although the fears of a year ago fortunately were not realized, there is no reason to believe that the plastics industry was needlessly seeking the aid of the Senate Small Business Committee and the mobilization agencies. Nor is it valid to claim that this was a premature cry of 'wolf' merely because the prediction that one-third of all injection molders would be forced to shut down by mid-1951 has proven untrue.

Rather, your committee feels that a combination of fortuitous circumstances and timely assistance saved this industry of small components from bankruptcy. In the first place, the delays in achieving maximum production of synthetic rubber afforded a large measure of relief when combined with the decision to return all the styrene not utilized to normal distribution channels. Secondly, the graphic and persuasive presentation of their plight by the plastics molders both individually and jointly brought a potentially disastrous situation to the attention of those in a position to make certain decisions (e.g., speeding up the conversion to a greater percentage of low styrene content GR-S) in time to save the industry.

"With the full backing of the NPA and the Office of Rubber Reserve, private companies in the United States were able to triple the amount of benzene coming into this country during the past 12 months; as matter of fact, the quantity has risen from an insignificant trickle during the first half of 1950 to a point where it constituted almost 25 percent of our total supplies during 1951. While it is questionable whether our economy should remain dependent upon foreign sources for this important chemical, there can be no doubt that the almost miraculous rise in imports during the past year saved many hundreds of small plastics firms from the industrial dump heap.

"While there were several complaints to the Senate Small Business Committee on specific phases of the endeavor, it (the industry) was extraordinarily successful in parceling out what were admittedly short rations. A few individual hardship cases arose, mainly as a result of expansions of molding capacity, but no firm was ever forced to close down completely, so far as your committee has been able to ascertain. One factor which may have contributed to the high business morale in this field might have been the fact that the material suppliers were not also integrated plastics molders, so that there was no rea-

son for any firm to feel that it was being slighted at the same time that his competitor, a subsidiary of his supplier, was able to fill all its requirements. In addition, this is an industry composed of predominantly small units with no giants and few really large concerns, almost all of whom are young and expanding."

Coatings for Metallizing Field

INTRODUCTION of its new line of coatings to the metallizing field—both vacuum evaporation and silver spray—has been announced by Doram Products, Inc., 410 Frelinghuysen Ave., Newark, N.J.

Doravac 17B and Dorasil 17B are thermosetting coatings used with cellulose acetate and butyrate prior to, and after, metallizing. They are reported to possess excellent adhesive qualities, high gloss, and durability, and to resist moderate exposure to mild solvents without becoming tacky.

Doramet 34, a tough, durable, flexible thermoset, exhibits exceptional adhesive properties. Its high solids content insures good gloss and reflectivity.

KS75, a polystyrene coating, has good adhesion and will not attack the base material, and it cures at 160° F. with good gloss and toughness. Polystyrene items, base coated with KS75, can be top coated with Doravac 17B after metallization so that styrene and acetate can be used together.

Metallized Polystyrene

METALLIZED polystyrene, produced by Coating Products, 136 W. 21 St., New York, N.Y., which has for some time pinch-hit for tight metals in such industrial applications as parts for juke boxes, radios, and so forth, is now in use in the hobby crafts field. The company found that Mirro-Brite copper-colored styrene, which looks like copper, can be worked into unusual effects with the same tools used for craft work with metals.

FINANCIAL

Visking Corp. and its Canadian subsidiary report net income for 1951 of \$2,714,653 on net sales of \$29,232,752 as compared with 1950 net income of \$3,173,157 on net sales of \$24,579,738.

Hercules Powder Co. showed net

PLASTICS SCRAP



bought
sold
reworked

OUR SERVICE

As the world's leading Plastics Scrap Reclaimers we offer the almost unlimited facilities of our vast plant to industry in these days of shortages in all basic raw-materials.

We have available over 150,000 sq. ft. of floor space devoted exclusively to the processing of plastics — virgin and scrap — resinous materials or by-products.

We specialize in the reduction to small particles — to your most exacting specifications — of all lumps, blocks, mill ends, bleeder waste — regardless of size and whether rigid or soft.

We also custom-compound all thermoplastics to your specifications.

We offer
the World's finest facilities for:
RECLAMING • REPROCESSING
RECOMPOUNDING • RECOLORING

We reprocess Your Plastics Scrap, By-Products, Surplus for Your own Re-Use.

We have complete laboratory facilities for Testing, Analyzing, and Pilot Running of Customer's Materials.

GRANULATING • PELLETIZING
CHEMICAL FLOTATION • WASHING • CLEANING • DRYING
SEPARATION OF CONTAMINATED MATERIALS
REMOVAL OF FOREIGN MATTER
COMPOUNDING • MIXING • COLORING • EXTRUSION

UNLIMITED KILN DRYING FACILITIES

A. BAMBERGER

CORPORATION
PLASTICS MATERIALS

703 Bedford Avenue, Brooklyn 6, N. Y.

Phone: Main 5-7150

CABLE: CHEMPROD BROOKLYN

PLASTISCOPE

sales and operating revenues of \$216,848,692 for 1951, which is an increase of 35% over the preceding year. Tax rise reduced net income in 1951 to about 6% below the preceding year; 1951 income was \$13,655,855; 1950 income was \$14,528,652. Construction expenditures for 1951 were \$15 million, and research outlay was almost \$5½ million.

American Cyanamid Co. has released the following financial report for 1951: net sales, including wholly-owned subsidiaries, of \$388,716,990, as compared with \$322,338,188 in 1950; consolidated net earnings of \$34,788,084 as against \$33,739,401 for 1950.

Minnesota Mining & Mfg. Co. reports record sales in 1951 of \$170,067,527, an increase of 11% over sales of \$152,806,313 the previous year. After taxes, net income in 1951 dropped 23% from the 1950 record of \$20,318,904 to \$15,738,452 in 1951.

Monsanto Chemical Co. reports sales for 1951 (exclusive of its British and Australian affiliates) of \$272,845,034, which represents a 20% increase over 1950 sales of \$227,135,206. After taxes, which were 40% higher than the previous year, 1951 net earnings of \$23,477,884 were 10% less than 1950 earnings of \$26,220,333. During 1951 the company invested more than \$38 million for expansion.

Celanese Corp. of America reports a net income of \$24,800,263 in 1951 compared with \$40,361,166 in 1950. Sales in 1951 aggregated \$202,651,014 as against \$232,483,942 the year before. Sales in the plastics division were slightly higher in 1951 than in 1950.

Durez Plastics & Chemicals, Inc. showed a 1951 net profit of \$2,250,602 compared with \$3,134,944 in 1950.

Shellmar Products Corp. set new highs in net sales and net earnings before taxes in 1951. Net sales were \$43,067,017, an increase of 27% over the 1950 sales record of \$34,039,990. Net earnings before taxes of \$5,986,280 were 20% above the 1950 high of \$4,971,046, but because taxes in-

creased 62% over 1950, net earnings in 1951 of \$2,067,395 were 19% below 1950 net earnings of \$2,562,712.

Heyden Chemical Corp. showed new highs in sales for 1951 with consolidated net sales of \$29,830,147, up 12% over 1950 sales. Net income after taxes in 1951 was \$2,363,455 as against 1950 net earnings of \$2,293,597. During 1951 the company spent \$860,000 for research and \$3,950,000 for expansion.

Farrel-Birmingham Co., Inc., together with its wholly owned subsidiary, **Consolidated Machine Tool Corp.**, showed combined net sales in 1951 of \$33,770,681, \$25,498,754 of which was accounted for by Farrel-Birmingham and represents a 48% increase over 1950 sales.

Watson-Standard Co. and wholly owned subsidiaries showed net income for 1951 of \$258,585 compared with \$271,481 for the previous year.

Dewey & Almy Chemical Co. showed a 1951 net profit of \$1,394,602 on 1951 sales of \$29,183,192. Earnings in 1950 were \$1,936,056 on sales of \$22,258,857.

Thiokol Corp. showed a net profit in 1951 of \$119,239 on net sales of \$4,841,627 as compared with a net profit of \$90,670 in 1950 on sales of \$2,522,382.

National Automotive Fibres, Inc., and subsidiaries, report net income in 1951 of \$3,200,220 on record sales of \$86,764,932, as compared with 1950 income of \$4,779,025 on sales of \$76,053,409.

National Rubber Machinery Co. showed a net profit in 1951 of \$675,628 on sales of \$12,016,027. Profit in 1950 was \$335,821 on sales of \$5,196,587.

E. I. du Pont de Nemours & Co., Inc., reports 1951 sales of \$1,531 million, which were 18% higher than the previous record in 1950. The company's net earnings of \$221 million in 1951 were \$87 million less than in 1950, a drop of 28 percent. Of this net profit, \$147 million came from Du Pont sources and \$74 million from General Motors Corp. divi-

dends. The company spent \$135 million in 1951 to build new plants and improve old ones, compared with \$114 million spent in 1950; \$47 million went for research expenditures in 1951 as against \$38 million in 1950.

I. B. Kleinert's Co. and wholly owned subsidiaries report net income for 1951 of \$401,100, which includes a special credit of \$118,125 representing profit on the sale of investment in Acushment Process Co. This compares with net income of \$491,053 in 1950. Sales were \$8,414,610 as against \$8,961,604 for 1950.

Continental-Diamond Fibre Co. and wholly owned domestic and Canadian subsidiaries report net income of \$1,234,078 on record net sales of \$27,341,038 for 1951 compared with \$1,565,657 on sales of \$21,392,276 in 1950.

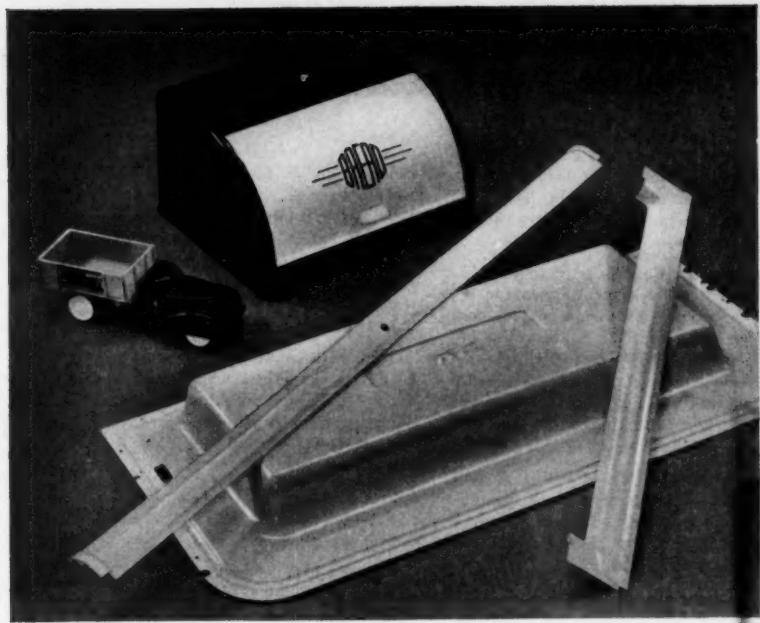
American Hard Rubber Co. reports 1951 net income of \$725,546 on net sales of \$22,104,523, as compared with 1950 income of \$902,773 on net sales of \$17,255,959.

EXPANSION

Hercules Powder Co. has announced that capacity for the production of Hercoflex vinyl plasticizers at Mansfield, Mass., has been stepped up 40% to meet customer demand. This increased output makes a third plasticizer, Hercoflex 290, available for the first time in tank car quantities, in addition to Hercoflex 150 and 250 which are primary phthalate-type plasticizers. Hercoflex 290 is the adipic acid ester of a blend of straight chain octyl and decyl alcohols and combines excellent low temperature performance with low volatility.

Monsanto Chemical Co. has expanded the research facilities of the Plastics Div. at Springfield, Mass., by one-third. A substantial part of the new facilities, which include a surface coatings application laboratory and a physics laboratory, will be devoted to color research. A color service has been set up and will issue periodic reports on color trends and color problems to molders and fabricators.

The company also announced completion of a new plant—first of its type on the West Coast—at Santa Clara, Calif., to manufacture butylated melamine and urea resins. The



Lustrex LH gives molders new ideas for increased business

New business opportunity knocks on the door for custom and proprietary molders who use Lustrex LH—an improved impact-strength material...with superior gloss...priced only a penny more than general purpose styrene.

Monsanto's Lustrex LH gives proprietary molders a sales-promotion extra in upgraded products—sturdier, stronger toys and housewares that last longer and mean fewer returns, less breakage in shipment.

Lustrex LH provides new sales-levers for industrial applications, too. You can capitalize on the improved impact-strength advantage

of Lustrex LH over general purpose styrene in selling your customers. Or, Lustrex LH can be used in many applications in place of higher-priced material...giving you a price advantage.

Lustrex LH, itself, has excellent moldability; and, it is available in eleven colors (including refrigerator white).

Why not write today for full information on how Lustrex LH, the improved impact-strength styrene, can help you gain more business...greater profits. The coupon is for your convenience.

Lustrex Reg. U. S. Pat. Off.



MONSANTO CHEMICAL COMPANY, Plastics Division,
Room 2617, Springfield 2, Mass.
Please send me more information on Lustrex LH, high impact-strength styrene.

Name & Title _____

Company _____

Address _____

City, Zone, State _____

PLASTISCOPE

resins, marketed under the trade name of Resimene, were formerly produced at Springfield. They are used by the paint industry in the manufacture of surface coatings.

Stemac Co. has purchased **W. L. Freeman Mechanical Engraving Co.** of Denver and consolidated both businesses at 1277 S. Cherokee St., Denver, Colo. Enlarged facilities now include die casting, manufacturing of machine tools, steel stamps and dies, tracer control milling, and two- and three-dimensional engraving.

Associated Mfg. Co., 541 S. Fair Oaks Ave., Pasadena, Calif., has enlarged its plant capacity for production of Amcove plastic drainboard and counter tops.

Tube-Kote, Inc., has completed a \$50,000 office building on the plant's 15-acre tract at 2520 Holmes Rd., Houston, Texas. The company pioneered the development of thermosetting coatings for oil field pipe and tubing used in the oil and chemical industries.

Synthane Corp., Oaks, Pa., is nearing completion on the eleventh addition to its plant which will add 18,000 sq. ft. of floor space to existing facilities. The new structure will house the firm's textile division and the small-lathe department.

COMPANY NOTES

Glass Fibers, Inc., Toledo, Ohio, has opened a branch sales office at 161 E. 42 St., New York 17, N. Y., with **Robert V. McCallister** as sales engineer.

Synthane Corp., Oaks, Pa., has established an Indianapolis sales office at 54 W. 30 St. headed by **Duane W. Roland**.

United States Rubber Co. has licensed four manufacturers of vinyl coated fabrics to make and sell Elastic Naugahyde, a stretchy vinyl plastic upholstery material made with knitted fabric backing used as upholstery material in the automotive and furniture industries. The four licensees are **Masland Duraleather Co.**, **Amber & Willard Sts.**, Philadel-

phia, Pa.; **Federal Leather Co.**, Belleville, N. J.; **Landers Corp.**, 837 Buckingham St., Toledo, Ohio; and **Textileather Corp.**, 607 Madison Ave., Toledo. Elastic Naugahyde, which was introduced in 1950 after eight years of development work, is manufactured at the company's Mishawaka, Ind., plant.

The Actna-Standard Engineering Co., Frick Bldg., Pittsburgh, Pa., has appointed **W. J. Langacher** as chief engineer and **G. E. Mandry** as assistant chief engineer of the **Pipe & Tube Division**.

Fred Mann & Co., Inc., has moved to enlarged quarters at 360 W. 50 St., New York 19, N. Y.

Rogers Corp., Manchester, Conn., has named the following midwestern sales representatives: **Gordon L. MacKinnon**, Cleveland; **Walter L. Erley**, Chicago; and **John W. Schorle**, Columbus, Ohio.

Industrial Ovens, Inc., 13825 Triskett Rd., Cleveland, Ohio, has opened a new web coating research and development laboratory. Investigation of production methods using plastisols, organosols, hydrosols, and silicones has been planned.

Nordan Plastics Corp. has moved to larger quarters at 101 Richardson St., Brooklyn, N. Y. The company's two plants are now located at this address.

Avery Adhesive Label Corp., 1616 S. California Ave., Monrovia, Calif., has opened a new factory service office at 4378 Lindell Blvd., St. Louis, Mo., managed by **James W. Wilson**.

Jackson & Church Co., Saginaw, Mich., has named **Francis F. Hoye** director of engineering and **Dr. Harold E. Graves** director of chemical engineering.

Monsanto Chemical Co. has announced several changes in the sales department of the **Plastics Div.** **Laurence H. Richards** is in charge of sales of Ultron vinyl film in New York. **Edgar S. Brockney** succeeds him as head of Vuepak sales in New York. **Gerald C. Clough, Jr.**, takes Mr. Brockney's place as head of

Vuepak sales in Detroit. **Robert W. Riedel** has been transferred to New York as technical service representative for Ultron film and **Eli Haddad** will do the same work in Springfield. **Robert S. Garvie** will handle vinyl resin and compound sales in New York and **Edward F. Seitz, Jr.**, succeeds him as sheet salesman in New York.

Molded Industrial Plastics, Inc., 150-45 12 Ave., Whitestone, N. Y., has installed a 16-oz. H-P-M injection machine. Company molding facilities now range from $\frac{1}{4}$ - to 16-oz. capacity.

Cadillac Plastic Co. has moved to its new plant and offices at 15111 Second Blvd., Detroit, Mich.

General Electric Co.'s Chemical Div. announces the appointment of four section managers in the newly-created silicone products department: **Robert O. Sauer**, engineering; **James R. Donnalley**, manufacturing; **Mark K. Howlett**, marketing; and **Paul D. Williams**, finance. **Dr. Ernest Ohsol** was named manager of the new product development laboratory for the same division.

General Box Co. has opened its new offices and laboratory at 1825 Miner St., Des Plaines, Ill.

Ohio-Apex, Inc., Nitro, W. Va., has appointed **Canada Colors & Chemicals Ltd.**, 1090 King St. West, Toronto, Canada, as sales representative for its plasticizer and chemical products in eastern Canada.

Plax Corp., Hartford, Conn., has named **P. J. Murphy** and **C. N. Sprankle** as sales managers of blownware products and extruded products, respectively. Both men will be located in the company's Hartford offices.

Columbus Coated Fabrics Corp., Columbus, Ohio, has announced several new fabric-like textures and multi-color prints for their sheeting material. They are Florentine, reproduced from Italian upholstery cloth; Jacquard, an embossed pattern to simulate a fabric weave; Libra, a four-color print combination that gives a textured finish to catch soft light; and Starburst with a design that suggests its name.

Harwick Standard Chemical Co., 901 Broad St., Trenton, N. J., reports that they now have sufficient quanti-

Naugatuck ROYAL FAMILY OF PLASTICS



Known by the customers we keep...

Here are just a few of our many customers...and the products we helped them make finer.



Naugatuck Chemical

Division of
United States Rubber Company
Naugatuck, Conn.

Marvinol[®] vinyl
Kralastic[®] styrene copolymers
Vimol[®] polyesters



PLASTISCOPE

ties of Silene EF to meet customer demand. Silene EF is a reinforcing pigment which has shown desirable properties in printing inks, vinyl compounding, and in the manufacture of flooring materials. It is especially good for formulating hard, abrasion resistant compounds.

PERSONAL

Robert J. Adam has joined the Detroit office of **The Dow Chemical Co.** He will handle sale of Styrofoam.

Charles F. Edelmann has been appointed Eastern sales representative for the **Velon Film Div.**, **Firestone Plastics Co.** His headquarters are at the firm's New York office, 350 Fifth Avenue.

E. A. Johnson, formerly with Borden Co.'s Chemical Div., has been named district manager in the **Resin Sales Section**, **The Barrett Div.**, **Allied Chemical & Dye Corp.** where he will handle sales throughout the eastern district.

Harry K. Collins, formerly with General Electric Co., has been appointed director of manufacturing by **The Continental-Diamond Fibre Co.**, Newark, Del.

Dr. Louis C. Barail, formerly with U. S. Testing Co., is now a private consultant in biochemistry and toxicology, with offices at 222 W. 83 St., New York, N. Y. Dr. Barail has done extensive research in the plastics and packaging fields.

Allen Latham, Jr., was elected a vice president of **Arthur D. Little, Inc.**, 30 Memorial Drive, Cambridge, Mass., consulting research and engineering firm.

Joseph J. Cucchi now represents **Penn Fibre & Specialty Co.** in the Detroit area. His offices are at 7442 14 Ave.

Robert L. Bloom has joined **Wilpet Engineering & Mfg. Co.**, 244 Dukes St., Kearny, N. J., injection molder and mold making specialists, as sales engineer, New Product Development.

Vincent Arch has been appointed works manager, **Vulcanized Rubber**

& **Plastics Co.**, Morrisville, Pa. He has been with the company nearly 25 years.

Jack Zimler has been transferred to the Sales Div. of **Victory Mfg. Co.**, 1722 W. Arcade Place, Chicago, Ill.

Barnard K. Sichel has been elected vice president of **Lerner Plastics, Inc.**, 502 South Ave., Garwood, N. J., to head engineering and production.

Vernon C. Pierce has been named general manager of **Kaye-Tex Mfg. Corp.**, 110 E. 23 St., New York, N. Y.

Jefferson W. Ellis has been named to head the laboratory of **Plastics Specialties Co., Inc.**, 1310 West Road, Trenton, Mich. He will be in charge of product development of Lamiply grades of resin impregnated fabrics, papers, and fibrous glass fabrics.

Sewall D. Andrews has been appointed general manager of the **Chemical Div.**, **General Mills, Inc.**, 400 Second Ave. South, Minneapolis, Minn. Mr. Andrews, who joined the company 20 years ago, will continue to serve also as director of sales.

George P. Kovach, formerly with Atlantic Tubing & Rubber Co., has become director of the **Plastics Div.**, **Clopay Corp.**, Clopay Sq., Cincinnati, Ohio.

Norman S. Mount has been loaned by **Ohio-Apex, Inc.**, Nitro, W. Va., to the Chemical Section of NPA as a commodity specialist in the Coal Tar Chemicals, Dyes & Intermediates Branch.

Herbert A. Fox has been named technical manager of the **Fiber Glass Div.**, **Libbey-Owens-Ford Glass Co.**, Toledo, Ohio. Mr. Fox was formerly project engineer at the division's Parkersburg, W. Va., factory.

M. M. Carmody has been appointed sales manager for **Ferro Chemical Corp.**, Bedford, Ohio, where he will handle driers, vinyl stabilizers, and fungicides.

John P. Coe, vice president and general manager of **Naugatuck Chemical Div.**, **U. S. Rubber Co.**, received the 1952 honor award for outstanding work in commercial chemi-

cal development by **Commercial Chemical Development Association**.

J. H. DuBois, formerly with **Plax Corp.**, has been named vice president in charge of engineering for **Mycalex Corp. of America**, Clifton, N. J.

George Harper has joined **Bolta-Saran, Inc.**, Lawrence, Mass., as head of the sales staff for developing and promoting new saran products.

Wesley Shepherd has joined **Industrial Plastics Corp.**, Elkhart, Ind., as production manager.

Donald L. Taylor has been named manager of general developments in the research and development section, **Hooker Electrochemical Co.**, 4706 Buffalo Ave., Niagara Falls, N. Y.

Deceased

Heyman Rosenberg, 78, founder and director of **Parker-Kalon Corp.**, 200 Varick St., New York, N. Y., died recently. He was the originator and patentee of self-tapping screws.

MEETINGS

May 11-14—American Institute of Chemical Engineers, French Lick Springs Hotel, French Lick, Ind.

June 16-20—Industrial Finishing Exposition, Annual Convention, International Amphitheatre, Chicago, Ill.

June 23-25—Forest Products Research Society, Sixth Annual National Meeting, Milwaukee, Wis.

June 23-27—American Society for Testing Materials, 50th Anniversary and Annual Meeting, Hotels Statler and New Yorker, New York, N. Y.

July 14-18—Western Summer Market, Western Merchandise Mart, San Francisco, Calif.

Sept. 9-13—American Chemical Society, Seventh National Chemical Exposition, Chicago Coliseum, Chicago, Ill.

Sept. 11-13—American Institute of Chemical Engineers, Palmer House, Chicago, Ill.

S.P.E. Meeting

May 14—Monthly meeting of Newark Section, Military Park Hotel, Newark, N. J. Dr. M. H. Bigelow, Plaskon Div., Libbey-Owens-Ford Glass Co., Toledo, Ohio, will talk on "Reinforced Plastics."

AETNA-STANDARD BUYS RUBBER AND PLASTICS DIVISION OF NATIONAL-ERIE

E. E. Swartwelder, President of The Aetna-Standard Engineering Company, Pittsburgh, Pa., announces the purchase of the rubber and plastics machinery division of the National-Erie Corporation, Erie, Pa., a subsidiary of Bucyrus-Erie Company.

The purchase includes the drawings, patents and records.

PRODUCTS

MILLS • WASHERS • CRACKERS
• SHEETERS • REFINERS • EX-
TRUDERS • STRAINERS • INSU-
LATORS • BANBURY MIXERS •
HYDRAULIC PLATEN PRESSES •
HORIZONTAL VULCANIZERS •
DEVULCANIZERS • SIMPLEX
QUICK OPENING DOORS • SPE-
CIAL MACHINERY

HALE & KULLGREN, INC., HANDLE SALES

The well known firm of (Andy) Hale & (Gill) Kullgren, Inc., Akron, Ohio, will continue to handle the sales, design engineering and development work for Aetna-Standard. The engineering and sales personnel of National-Erie will join Hale & Kullgren in Akron, Ohio.

50 YEARS OF CREATIVE ENGINEERING

Aetna-Standard has a long and enviable record in the business of engineering and manufacturing machinery for the ferrous and non-ferrous industries. They have two large, well equipped plants and are now completing a major expansion program to provide the best facilities for producing production machinery.

Aetna-Standard will manufacture a complete line of rubber and plastics machinery in their large, well equipped plant at Warren, Ohio. Sales and design engineering will be handled by Hale & Kullgren, Inc., Akron, Ohio.

In the ferrous and non-ferrous industries, Aetna-Standard is well known for continuous butt weld pipe mills, seamless tube

mills, continuous coating lines, flat-rolled equipment and draw-benches. The company has also been active in the rubber machinery field as a rebuilder of Banbury Mixers and in the development of heavy basic machinery.

The company will take over many of the orders on National-Erie's books and will solicit new orders through Hale & Kullgren, Inc.

Sales Distributors and Designers
HALE & KULLGREN, INC., Akron, Ohio

Aetna-Standard

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Plants in Warren, Ohio • Ellwood City, Pa.

Pennsylvania

CLASSIFIED ADVERTISEMENTS

MODERN PLASTICS reserves the right to accept, reject or censor classified copy.
EMPLOYMENT • BUSINESS OPPORTUNITIES • EQUIPMENT (used or resale only)

MACHINERY and EQUIPMENT FOR SALE

FOR SALE: Quick delivery Rubber and Plastic Equipment. Farrel 16" x 48", and 15" x 36" roll rubber mills. New 12" x 6" and 6" x 16" Lab. Masticators. New 12" x 18" Lab. Mills up to 54". Royce #4 and #2 extruders, also other sizes. 200 ton Brunswicke 21" x 21" Platens, 14" Ram. Record Presses. Francis 175 ton 24" x 18", W.S. 100 ton 24" x 24". Also presses Lab. to 1500 tons from 12" x 12" to 48" x 48". Hydr. Oil Pumps. Gould 75 H.P. motor Dr. 2" x 12" ram. 200 ton 24" x 24". 100 ton 24" x 24". 4 Plgr. High and low Pressure Hydr. Pumps. HPM 5 GPM 2700 lbs. Elmes Hor. 4 Plgr. 4500 lbs. and 5500 lbs. Hydr. Accumulators. Closed Steel ASME Pressure Tank 275 PSI. 1200 gal. Stokes Automatic Molding Presses. Roarty Single punch Tabletting Machines 3/4" x 1" and 1 1/2" x 1 1/2". Injection Molding Machines 1 oz. to 32 oz. Baker Perkins jacketed mixers 200, 100, 50, 25 and 4 1/2" gal. Ball & Jewell & Leominster Plastic Grinders. Mikro Pulverizers 2 DH, 10 HP & other sizes. Heavy duty mixers, grinders, pulverizers, gas boilers, etc. Partial listing. Also 200 ton surplus machinery. Stein Equipment Co., 200 West Street, New York 6, N.Y. Worth 2-5745.

FOR SALE: 50 Ton Stokes Presses & Pump, 200 Ton W.S. Hobbing PRESS, 300 Ton W.S. PRESS, 200 Ton W.S. PRESS, 300 Ton P.M. PRESS 30 x 30 Plates, 150 Ton Farrel PRESS 30 x 30 Elec. Plates, 140 Ton W.S. PRESS 23 x 17 Platens, 85 Ton Stewart Bolling PRESS 20 x 20 Platens, 50 Ton Elmes PRESS with 18 x 18 Elec. Plates, 75 Ton W.S. PRESS 13 x 15 Platens, 75 Ton ADAMSON PRESS 22 x 20 Platens. Laboratories, press, Accumulators, Pistons and Oil Pumps. AARON MACHINERY CO., INC. 45 Crosby St., N.Y.C.

FOR SALE: 1 Stokes DD2 Rotary Tablet Machine, Variable Drive and motor; 1 Farrel 12" x 18" Lab. Mill complete with drive and 32 H.P. Motor. 2" Bolts for #2 Royce Cutters, 58 H.P. Motors. Also Grinders, Extruders, Compression and Injection Molding Presses, Mixers, etc. Send us your inquiries. Consolidated Products Co., 13-14 Park Row, New York 38, New York.

We handle hydraulic presses, pumps, and power units of all sizes. Write us your requirements and we will try to help you. We find it impossible to list our equipment in this classified column, but we do know that the equipment sold before us is published. For those who seek action look in the New York Times under the Machinery and Tool Column for our regular Sunday Special. Hydraulic-Sal-Press, Inc., 356-39 Warren Street, Brooklyn 2, N.Y. Main 4-7847

FOR SALE: Thermex Preheater, Model 2P; Airtronics Preheater, Model D E; Airtronics Preheater, Model C B. Like new. AARON MACHINERY CO., INC. Worth 4-8233, 45 Crosby St., New York 12, N.Y.

SAVE WITH GUARANTEED REBUILT EQUIPMENT—RUBBER MIXING MILL, heavy duty 17" x 18" HYDRAULIC PRESSSES: 220 tons; 18" x 48" ram; 36" x 36" 16" ram; multiple opening, 250 tons; 37" x 37" 30" ram; multiple opening 1660 tons; 20" x 20" 16" ram; 200 tons; 22" x 15" 8" ram, 75 tons; 14" x 14" 8" ram, 75 tons; 12" x 12" 8" ram, 75 tons; 18" x 24" 10" ram, 75 tons; 18" x 18" 7 1/2" ram, 60 tons; 12" x 12" 7 1/2" ram, 60 tons; 8" x 8" ram, 50 tons; 10" x 10" 6" ram, 50 tons; 8" x 9 1/2" 6 1/2" ram, 28 tons; 16" x 16" 8" ram, 12 tons; LABORATORY PRESSSES: 10 ton 6" x 6" Carver, 20 ton 8" 8" Carver; NEW UNIVERSAL DUAL PUMPING UNITS: 3 to 15 H.P.; NEW LABORATORY HIPS & CALENDERS; EXTRUDER: Royce #1 Plastic Extruder; 4 Plgr. ACCUMULATOR HIPS & PUMP 6" ram 2500#; Preform Presses all sizes, also Mixers, Vulcanizers, Injection Molding Machines, etc. Universal Hydraulic Machinery Co., Inc., 285 Hudson Street, New York City 13, N.Y.

FOR SALE: MODERN HYDRAULIC PRESS-ES-4000 ton Downstroke Hydraulic Press by John Shaw & Sons; table 7" x 4"; daylight 6"; ram 42" diameter—3000 ton 6-daylight John Shaw Board Press; fitted steam platens 9" x 4" with self-contained Pumping Equipment—1000 ton 6-daylight Sheet or Belting Press by Hirschfeld & Dorn; table 18" x 7 1/4"; with self-contained Air Hydraulic Accumulator and Pump—2400 ton 6-daylight Press by Greenwood & Butler; fitted steam platens 6 1/4" x 3 3/4", with loading and unloading gear—2000 ton Downstroke Hydraulic Press by Fielding & Platt; table 5" square; daylight 6" x 6" max. Large Hydraulic Accumulators, Pumps, etc., in stock. Reed Brothers (Engineering) Ltd., Replant Works, Cuba St., Millwall, London, E.14. Cables REPLANT LONDON.

FOR SALE: BALL & JEWELL GRINDER: Standard Identical, magnetic hopper, frame; little used. LYDON OVER 1000 H.P. dimension 30" x 42" wide. Parlow controls up to 35 degrees; 24 trays. WATSON-STILLMAN INJECTION MACHINES (two), Vertical 1-ounce, Charles Foster & Co. Inc., 46-36 22nd St., Long Island City 1, N.Y. Phone: STILL-well 4-3435

FOR SALE: Injection Presses: 12 oz. HPM, 9 oz. HPM cylinder, 6 & 12 oz. Reed, 8 oz. Lester, 8 & 24 oz. Watson, 22 oz. Impro, 3 oz. vert. Munton, 1 oz. Vandorn. Extruders: NEMA 40 conveyor, Island 22 conveyor, Cumberland Reamer, Island 22 conveyor, Grinding Trouough, Scrapgrinders, Ovens 150 & 200°. Thread presses, 250 & 600 T. Compression presses, 250 T. Laminat. Press 23 x 27" Pl. Colton E. Stokes, T. Kux 60B Preform presses. Nash Rotary edger, Sheridan Embossing press 9 A. Danner 1000 H.P. pump press assembly. 42" Johnstone Slatting machine. Like your surplus equipment with me. Justin Zinner, 825 W. Waveland Ave., Chicago 13, Ill.

FOR SALE: 2 15-ton Stokes 200D3 presses new in 1946 and 1951. One with unscrwing device. Reply Box 1500, Modern Plastics.

FOR SALE: 4 oz. complete injection molding unit consisting of HPM injection molding press with power driven feed screw, complete with pump and motor, electric heating elements, full controls. New 1948. Also includes one Cumberland Chopper, one Reed Sigma blade blower with 1/2" H.P. motor, and tunneling bar with 1/2" H.P. Unit complete ready to run. STEWART BOLLING & COMPANY INC. 3190 EAST 65th Street, Cleveland 27, Ohio

FOR SALE: Complete wood flour mill. Capacity 10 tons per 24 hours, using nearby supply of pine and poplar. For further particulars address Box 1500 Modern Plastics.

FOR SALE: Kux Model-25 Rotary Presses, 21 punch and 25 punch Stokes Models D-3 and D-4 Rotary Presses, 16 punch. Head 600# Jacketed Ribbon Mixer. PERRY EQUIPMENT CORP., 1429 N. 6th St., Phila. 22, Pa.

INJECTION MOLDING MACHINES: 8-0z. W.S. new 1946, good cond. \$7500. 1-2-4-6-8-9-12-16-22-32-62 oz. IMPEO, REEDS, HPM, & other W.S. LAMINAT, full details on request. PLASTIC EXTRUDERS: Hartig 13" x 3 1/2" screw, good cond. \$4500 up. #1 ROYAL new 47" x 2" screw, good \$2975.

HYD. COMPRESSION PRESSES: HPM, 1300, 450, 350 ton; new 1945. O.P. 22-22 1/2 tons, 24" x 35, 24" x 37" \$2975 up. W.S. 50T, auto. Trans. 1000 H.P. Mich. 1000 H.P. Standard 75 ton; 16" x 16" platens; vert. \$1250. Farrel 200 tons; 14" ram, 24" x 24" platens, \$1250.

MISCELLANEOUS: Ball & Jewell-Robinson, 50-75 HP Grndr \$2950. Vickers-Wilson 17 GPM 1000 H.P. \$2500 up. Federal Megatherm, Indent Table, Vulcanizing Molds, Hitron Hi Frequency plas, ceiling mchns. Offers. EVERYREADY SUPPLY CO. E. J. McCallum, Jr. 805 Housatonic Ave. 4-9471. Bridgeport, Connecticut.

FOR SALE: 4 oz. HPM Injection Molding Machine, Model No. 100-H-4; 100 ton clamp; injection pressure 2,100 psi; serial no. 22825; now operating on production in our plant. Require larger machine. Approximately 8 years old. Detroit Plastic Molding Co. 26200 Harper Ave., St. Clair Shores, Michigan.

FOR SALE: American-Marsh Steam Driven Hydraulic Pump, Size 18" x 3" x 12", working steam pressure 150 PSI. Hydraulic pressure 2500 PSI. Hard Chrome Plated Water Plungers. Stainless steel water valves and seats. 2" Water inlet, 1 1/2" Water outlet. In excellent condition. Reply to Modern Plastics Corporation, North Shore Drive, Benton Harbor, Michigan.

FOR SALE: 32-ounce Reed Prentice, Model 10182. Press less than two years old. Actual running time less than six months. Special electrical controls part. Selling machine due to shift in sales plans requiring smaller equipment. Equipped with stiffer and adjustable knock-outbars. Will guarantee press. Reply Box 1497. Modern Plastics.

MACHINERY and EQUIPMENT WANTED

WANTED: To Expedite Production—Rubber Making Machinery including Banbury Mixers, Rubber Reclaimers, Rubber Mills, Rubber & Mixer Extruders, Grinders & Cutters, Hydraulic Equipment, Rotary and Vacuum Self Dryers, Injection Molding Machines. Will consider a set up plant now operating or shut down. When offering give full particulars. P.O. Box 1351, Church Street Sta., New York 8, N.Y.

WANTED: REED PRENTICE 8-oz. or 12-oz. or HPM 9-oz. Must be post-war models. Send full particulars to Box 1477, Modern Plastics.

WANTED: 1 or 1 1/2" Nylon Extruder, 2 1/2" & 3 1/2" Extruder, 8 oz. & 16 oz. Injection Press. All in good operating condition. Quots cash price. Delivery immediately or within 2 months. Box 1490, Modern Plastics.

WANTED: 1—2 Roll, 30" Rubber Mill, roll speed not to exceed 1.2, good condition with or without drive. Within 500 mile range. Reply Nichols Engineering, 479 Ferry Blvd., Stratford, Conn.

WANTED: 4 1/2" or 6" Rubber or Plastics Extruder. MAYNARD PLASTICS, INC., 4 Dudley Street, Chelsea 50, Massachusetts.

WANTED: Injection machine, 4 oz. or 8 oz. Must be in perfect operating condition. State make, year and price. Plastic Products, Inc. Pine Street, South Norwalk, Conn.

WANTED: Injection Mold. Mchines, Hydr. presses, extruders, Hydr. Pumps, & complete plants, all sizes; SUPERIOR MACHINE TOOL CO., 803 Housatonic Ave., Bridgeport, Connecticut 4-9471.

WANTED: 8, 12 or 16 oz. Reed Prentice Injection Molding Machine; must be less than 5 years old and in good condition; write or wire size, price, year built and where located. Advise if machine is now running. Detroit Plastic Molding Co. 26200 Harper Ave., St. Clair Shores, Michigan.

MATERIALS FOR SALE

FOR SALE: 35 tons Urea Formaldehyde Molding Powder, Ivory soft flow, priced considerably under cost. CHEMICAL SERVICE CORP., 96-94 Beaver St., New York 5, N.Y. (Continued on page 222)

Complete Line of
Machinery for Celluloid
 and Plastics Mfrs.
JOHN J. CAVAGNARO

HARRISON

ESTABLISHED 1881
 Engineers and Machinists

NEW JERSEY

Presses for De-
 hydrating, Fil-
 tering, Caking,
 Polishing, Stuff-
 ing, etc.



Mixers: Plain or Stainless
 Preliminary or Vacuum

DENFLEX
PLASTISOLS
 for
MOLDING
DIPPING
COATING

Immediately Available From

DENNIS
CHEMICAL COMPANY

2701 Papin St. St. Louis 3, Mo.

Benefit from our many years
 of experience in this
 specialized field

ORGANOSOLS

VINYL COATINGS

WOLOCH POLYETHYLENE • WOLOCH POLYETHYLENE •

Processed
POLYETHYLENE
Pellets

to supplement your allotments

Our product is ideal for
 extrusion and injection molding
 colors: *Natural — Brown — Black*

GEORGE WOLOCH PRODUCTS CORP.

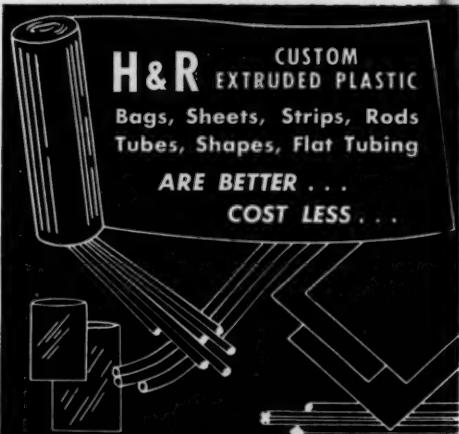
82 Beaver Street, New York 5, N. Y. • HAnover 2-1171



Every day more and more people say:
 we like to do business with WOLOCH

WOLOCH POLYETHYLENE • WOLOCH POLYETHYLENE •

H & R CUSTOM
 EXTRUDED PLASTIC
 Bags, Sheets, Strips, Rods
 Tubes, Shapes, Flat Tubing
 ARE BETTER . . .
 COST LESS . . .



H & R offers a complete custom extrusion service capable of turning out the right plastic material in the exact form you need, at a price you'll appreciate. We are fully equipped to make all necessary dies and to fabricate heavy polyethylene with hot gas welding.

Send us your problem—we'll be glad to send samples, recommendations and quote prices. Absolutely no obligation on your part.

H & R INDUSTRIES
 344 E. Walnut St., Nazareth, Penna.

CLASSIFIED ADVERTISING

(Continued from page 220)

FOR SALE: From over-stocked inventories, at prices far below schedule—Molding powder, melamine resin, urea crystals, acrylic acid, diacetone acetone, glycerine, diethyl phthalate, washed scrap butyl, formaldehyde, vinyl butyl scrap. **FARBER PRODUCTS COMPANY, INC.**, 226 LaFayette Street, New York City 12, N. Y. Beckman 3-6120.

MATERIALS WANTED

WANTED: PLASTIC Scrap or Rejects in any form. Acetate Butyrate, Polystyrene, Acrylic, Vinyl Polyethylene, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding, magnetizing and compounding. Reply Box 1474, Modern Plastics.

WANTED: PLASTIC SCRAP or REJECTS in any form: Cellulose Acetate, Butyrate, Polyethylene, Polystyrene, Vinyl, Tercile, Ethyl Cellulose. Reply Box 1475, Modern Plastics.

WANTED: Plastic Scrap, Rigid Vinyl, Cellulose Acetate, Polystyrene, Polyethylene, Butyrate, Custom grinding, magnetizing, compounding, and straining of contaminated plastics. Franklin Jeffrey Corporation, 1671 McDonald Avenue, Brooklyn, N. Y. ES 5-7942.

WANTED: Plastic scrap such as Cellulose Acetate, Vinyl, Acrylic, Ethyl Cellulose, Polyethylene, etc. We also buy surplus inventories of molding powder or grind, clean and reprocess your own scrap. Claude P. Bamberger, Inc., 152 Centre St., Brooklyn 21, N. Y. Tel. Main 5-5553. Not connected with any other firm of similar name.

SURPLUS UREA MOLDING POWDER
WANTED. Reply Box 1478, Modern Plastics.

WANTED: By injection molder—Polystyrene molding powder in any form: scrap, reground, mixed colors, surplus virgin, etc. will purchase on contract basis if desirable. Send samples and best quotations to Walker Products Molding Co., 132 Mallory Ave., Jersey City, N.J.

WANTED: Large quantities of Reground or Virgin Polystyrene, Acetate and Butyrate in solid colors. We are interested in obtaining a steady supply of these materials. Please send samples and full description of the materials as well as prices. Reply Box 1493, Modern Plastics.

MOLDS WANTED

MOLD WANTED for injection molding. We will buy one mold or a complete line or series of molds for finished reusable items. Houseware, toys, etc. Will also buy molds for industrial parts such as knobs, drawer pulls, gears. All items for reuse. U. S. A. Send detailed information to Victory Manufacturing Company, 1722 W. Arcade Place, Chicago 12, Illinois.

WANTED: Compression molds for buttons, to buy or for rental. Also single punch tabletting machine similar to Stokes Model R. All suitable guarantees offered. Willing to enter into continuous contractual arrangements with suitable American firm. Reply P. O. Box 48, Mexico, D. F., Mexico.

WANTED: BRUSH MOLDS FOR CASH— Injection molds for ladies, men, military, nail, tooth, brushes, etc. Send particulars and samples. Box 185 Realservice, 110 W. 34 St. N. Y. C.

INTERESTED IN MOLDS for novelty, toy and notion items—also jewel boxes and trays. Will buy outright. Please give full description, price and all necessary information in first letter. Write Box 1492, Modern Plastics.

WANTED: Molds for injection molding, discontinued Housewares, Bar & novelty items. All items for resale in U.S.A. Send detailed information to Collins Products—Box 465—North Hollywood, Calif.

HELP WANTED

VINYL COATING ENGINEER—Experienced in organics and plastics. Furnish details of experience first letter. Reply Box 1486, Modern Plastics.

SALES MEN FOR ESTABLISHED CHICAGO INJECTION MOLDER with capacity to 200 oz. Prefer experience in plastics and capable of giving some engineering service to customer. Will consider men controlling one account or deal. Men required in all industrial areas plus men for Chicago office. Application and desired cooperation of plant equipped for volume molding, assembly, painting, etc. Give complete details to Box 1476, Modern Plastics.

TECHNICAL SERVICE REPRESENTATIVE: One of leading chemical companies needs technical service representative to many other industries on industrial resins, particularly the laminating type. Engineering background, sales personality and diligence essential. Will also act as liaison among various intra-company departments. Considerable travel required. Opportunities for progress are excellent. Prefer man 25-30 years of age. Please give qualifications and salary requirements in reply to Box 1479, Modern Plastics.

Help wanted for expanding Injection Molding Plant: Quality control man; Spray booth man; Assembly line assistant foreman. State experience and background. Write to: Plastic-Ware, Inc., 2 Duane Street, N. Y. C. Att: E. Margolis.

FIBERGLAS REINFORCED PLASTICS MOLDER wants reliable commission representatives for New England, Chicago and Southern areas. Prefer men with non-conflicting plastic lines now calling on manufacturers. Reply Box 1482 Modern Plastics.

VINYL RESIN SALESMEN: Established producer of Vinyl Resins, expanding rapidly and has desirable opening for several Field Salesmen. Technical background of calendering, extrusion and dispersion processing essential. Sales experience desirable, but not mandatory. Send resume of training, experience and salary requirements to Box 1485, Modern Plastics.

TECHNICAL SALES REPRESENTATIVES WANTED: Prominent Injection Molder expanding in Custom Molding Field. Large Plant located in New York area. Equipment for: Designing, Tooling, Molding, 40 milimeter, Laminating and Decorating. Desires representation in Midwest; Western Pennsylvania; upper New York state; New England. Send complete resume. Box 1486, Modern Plastics.

SALES REPRESENTATIVE WANTED FOR FOUNDRY RESINS. Reliable Concern. Our men know about this advertisement. Reply Box 1489, Modern Plastics.

SUPERINTENDENT: To run Injection and Compression Plant contemplated for Cuba. Must have knowledge Spanish language. State age, experience, expected salary. Reply Box 1498, Modern Plastics.

CHEM. ENGINEER: Familiar with phenolic resins needed by well established company in southern California. Background should include manufacture of phenolic resins, development of new products, and ability to start a hard project. To the right man we offer the opportunity to grow with our present expanding operations. Give full details and salary desired. Replies confidential. Box 1494, Modern Plastics.

WANTED: Engineer thoroughly experienced in production of calendered vinyl film and sheeting also capable of installing new equipment. Box 1495, Modern Plastics.

PLASTIC EXTRUSION SUPERINTENDENT and Foreman wanted by leading Southern California plastics company. Expanding production facilities. Experienced only need apply. State experience. Reply Box 1496, Modern Plastics.

WANTED: DIRECTOR — PLASTICS RESEARCH AND DEVELOPMENT Career opportunity with nationally known Eastern company. To administer a program of research and product development in the reinforced plastics field. Essential— at least five years experience in research and development of plastic materials—notably polyesters. A Master's degree in Chemistry or Chemical Engineering, or better. Preferred age, 35 to 55. Compensation—over \$10,000 a year. Write or telephone. Negotiations handled without client's name. **WESTON RICHARDSON AND ASSOCIATES, Consulting Management Engineers, 11 West 42nd Street, New York 36, N. Y. CHIckering 4-9106.**

PROJECT ENGINEER, preferably M.E. to handle product development of all thermoplastics with progressive New England company. Experience in thermoplastics desirable but not essential. Send complete resume giving education, experience and salary commanded or required in first letter to Box 1504, Modern Plastics.

DEVELOPMENT ENGINEER: Familiar with the formulation and application of resins material for surface coating. Experience in the application of such materials to continuous web highly desirable. Submit complete resume, along with recent numbered salary requirements. Good starting salary, many desirable employee benefits. Reply Box 1506, Modern Plastics.

MIDWEST SALES REPRESENTATION: You may be an established salesman, thoroughly experienced in handling sales in a broader field, or the opportunity to represent—in the midwest, in the south, and in the southwest—a major eastern, long established, custom injection moulder. Must have proven sales ability, imagination, and vision to become a high income earner. Must be able to call on and develop large volume molding facilities up to 20 pound pieces, complete plastics metallizing equipment, outstanding engineering staff, own die shop, and an organization of 300 devoted exclusively to the customer's production—an AAA corporation. Give full resume, experience and references. All inquiries held in strict confidence. Reply Box 1502, Modern Plastics.

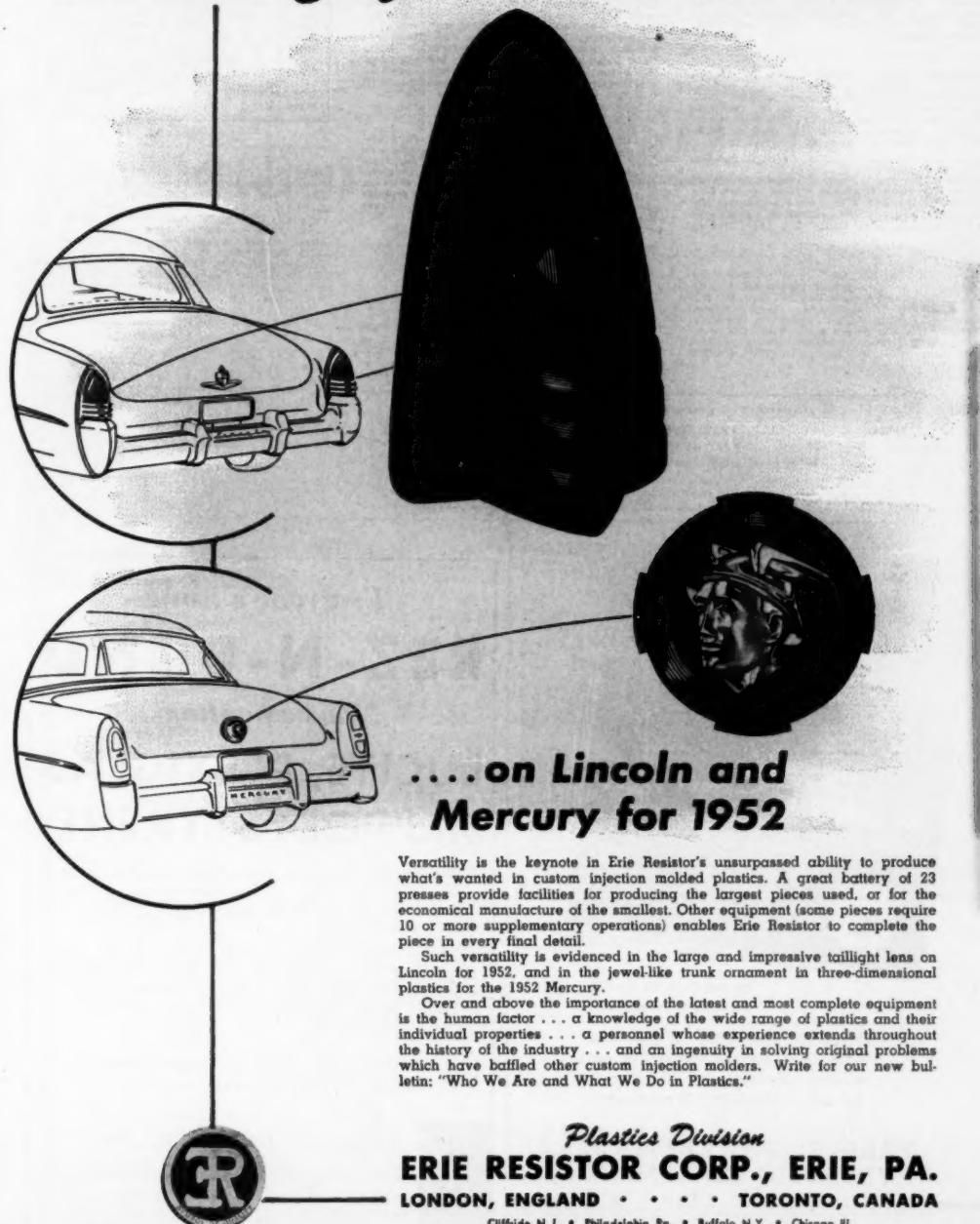
SITUATIONS WANTED

EXTRUSION ENGINEER: Broad background in extrusion of thermoplastic(s) and thermosetting resins and composites and allied subjects. Desires responsible position with progressive extruder or machinery manufacturer. Laborator, plant and field experience. Willing to travel. Reply Box 1481, Modern Plastics.

(Continued on page 224)

"Nothing Could Be Finer..."

than these Erie Custom Molded Plastics



Versatility is the keynote in Erie Resistor's unsurpassed ability to produce what's wanted in custom injection molded plastics. A great battery of 23 presses provide facilities for producing the largest pieces used, or for the economical manufacture of the smallest. Other equipment (some pieces require 10 or more supplementary operations) enables Erie Resistor to complete the piece in every final detail.

Such versatility is evidenced in the large and impressive taillight lens on Lincoln for 1952, and in the jewel-like trunk ornament in three-dimensional plastics for the 1952 Mercury.

Over and above the importance of the latest and most complete equipment is the human factor . . . a knowledge of the wide range of plastics and their individual properties . . . a personnel whose experience extends throughout the history of the industry . . . and an ingenuity in solving original problems which have baffled other custom injection molders. Write for our new bulletin: "Who We Are and What We Do in Plastics."

Plastics Division
ERIE RESISTOR CORP., ERIE, PA.
LONDON, ENGLAND • • • TORONTO, CANADA

Cliffside, N.J. • Philadelphia, Pa. • Buffalo, N.Y. • Chicago, Ill.
Detroit, Mich. • Cincinnati, Ohio • Los Angeles, Calif.

CLASSIFIED ADVERTISING

(Continued from page 222)

VINYL & RUBBER DEVELOPMENT CHEMIST: BS CHE—with 13 years experience in product development and technical sales desires position in metropolitan area. Thoroughly familiar with all techniques of compounding, color, extrusion, calendering and production. Qualified for position as plant production manager or technical director with plastics manufacturer who needs experienced supervision. Age 35. Married. Reply Box 1484, Modern Plastics.

Personable young chemist under 30 desires position in chemical sales or technical service. Experienced in organic research and pilot operations. Presently employed in customer service and development with vinyl dispersions. Location secondary, free to travel. Reply Box 1485, Modern Plastics.

Position in research and development of Screw Extrusion Machines wanted by machine draftsman familiar with patent and analytical literature about screw extrusion. Metropolitan New York area. Reply Box 1487, Modern Plastics.

PLASTICS ENGINEER: Vinyl extrusion experience covers production management, purchasing, inventory and quality control, formulating and compounding, scrap reclaim, machine and die design, materials handling, operator training. Some work with film blow-molded rigid pipe extrusion. Desired position with future. Married. Reply Box 1489, Modern Plastics.

All classified advertisements payable in advance of publication
EFFECTIVE WITH MAY, 1952 OUR RATES WILL BE AS FOLLOWS:

Up to 40 words	\$10.00	Up to 120 words	\$20.00	Up to 180 words	\$30.00
Up to 60 words (boxed)	\$20.00	Up to 120 words (boxed)	\$40.00	Up to 180 words (boxed)	\$60.00

For further information address Classified Advertising Department, Modern Plastics, 575 Madison Avenue, N. Y. 22, N. Y.

SALES MANAGER AVAILABLE: Formerly associated in executive capacity with leading plastic injection molder of houseware and novelty items. Over 10 years of successful background recruiting, hiring, training, and managing sales forces. Excellent contacts with all major companies in the industry. Experience in the design, development and marketing of new products. Presently located in New York area. Reply Box 1498, Modern Plastics.

PRODUCTION FOREMAN: Age 33, with six years' experience in compounding and processing vinyl elastomeric and rigid materials. Extensive experience on sheeting and films, and familiar with molding and extrusion materials. Experience includes quality control, press planning, and formulating. Desires position with better opportunity for advancement. Will relocate. Reply Box 1508, Modern Plastics.

Practical M. E.: 45 years old, eighteen years' injection mold, thorough knowledge modern mold design, molding, rating and degating, automatic tooling for secondary operations, fabrication of nitrate and acetate sheeting desires to change position to progressive growing firm. Available thirty days. Reply Box 1503, Modern Plastics.

MISCELLANEOUS

PLANTS AND FACTORIES WANTED: Plastic injection plant wanted, approx. 3 to 6 oz. machines, for cash. Write giving full particulars. Box 1501, Modern Plastics.

Am severing my connections with five companies with whom have held position of Secretary and Assistant Treasurer for the past ten years. Organizing sales force to sell plastic products, including machinery. What have you to offer? Graduate of Plastics Institute of Chicago. Reply Box 1507, Modern Plastics.

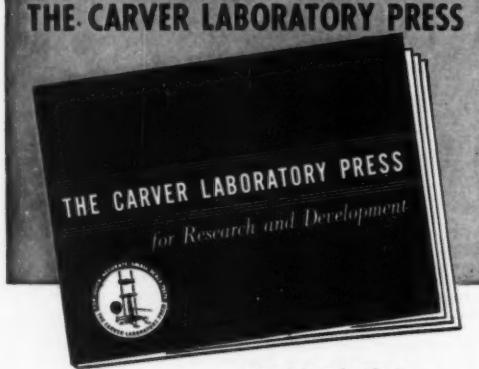
PATENT ABSTRACTS: We prepare abstracts of British Patents affecting Plastics and allied materials immediately they become open to public inspection in London, and air mail them to subscribers who receive them long before they are dealt with in the technical literature. Many large organizations are using this service. Details and specimen from CURRENT INFORMATION, 17 Cedar Road, Berkhamsted, Herts, England.

PERFECT FOR NOVELTY MANUFACTURE: Novelty cigarette holder—available on a royalty basis or outright sale. U.S. Patent #790,617. Many distinctive features: Self-righting, if dropped, regardless of angle, prevents fire or burn. Has sanitary mouth-piece, ribbon to conform with curvature of teeth for comfort in smoking; also has chambered tip to guide cigarette for blind loading. Dovetailed base, permits metal nameplate insert. Ideal for gift or promotional purposes. Reply Box 1491, Modern Plastics.

PATENT LICENSE WANTED: For the manufacture of building materials from plastic, the reinforcing Fibrelite for well recognized German wholesale house. Write to Dr. Pieper, (20b) Markoldendorf, British Zone, Germany.

Well established compression plastic manufacturer wishes to merge with another plastic concern of different character extrusion or injection molding. Reply Box 1505, Modern Plastics.

Complete New Catalog describes the Latest Edition of THE CARVER LABORATORY PRESS



Factual Data for Plastics
Research & Development

Send for your copy of this new
handy-size manual containing up-to-date information on the Carver
Laboratory Press and its many uses.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT

3 CHATHAM ROAD, SUMMIT, N. J.

Everyone's using **REZ-N-BOND** for cementing **LUCITE, PLEXIGLAS** and **POLYSTYRENE!**

Water-white non-inflammable REZ-N-BOND is the ideal bonding agent for polystyrene as well as Lucite, Plexiglas and all other acrylics.

REZ-N-BOND sets instantly and is ready for finishing operations within an hour. It produces perfect, optically clear joints as strong as the plastic itself. REZ-N-BOND is also available in 22 beautiful colors.

In addition to REZ-N-BOND we also manufacture H-94 and H-114 cements for acrylics.



Schwartz CHEMICAL CO., INC.

328 West 70th Street
New York 23, N. Y.

41 San Jose Ave.
Burbank, Cal.



• SELECTRON Resins are used to make tough, translucent skylights that reduce installation and maintenance costs.

Pittsburgh

Now
Ready
For a
Thousand
New Uses!

Just a few products in which
Pittsburgh **SELECTRON**
Resins are now used—

Aircraft structural parts
Radomes for electronic equipment
Life floats
Ballistic panels
Helmets
Boat hulls
Machinery housing and guards
Trays
Tote boxes
Food lockers
Garbage pails
Baskets for automatic dishwashers
Baskets for automatic washers
Wash tubs
Tool chests
Shipping containers
Instrument cases
Laundry hampers
Kitchen containers
Fishing rods
Sinks
Street signs
Traffic signs
Fluorescent light fixtures
Television cabinets
Loudspeaker housings
Gas meter housings
Structural panels for
offices and homes
Door and transom lights
Awnings and canopies
Greenhouse panels
Skylighting
Molded chairs
Prefabricated houses and garages
Truck bodies

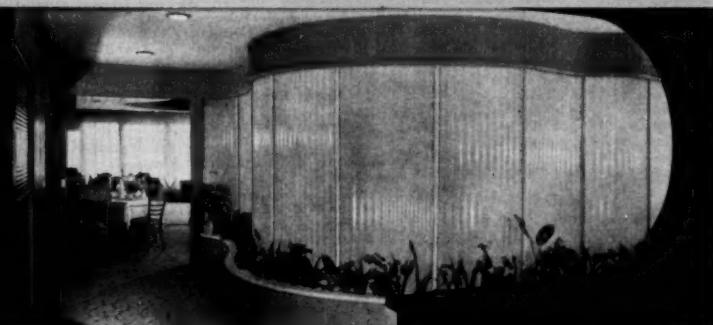


PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

From skylights to decorative
partitions—durable structural
panels are made with . . .

Selectron
Polyester Resins



• Colorful corrugated panels made with SELECTRON Resins, add to the sparkle and beauty of a country club dining room. Photographs courtesy of the Corrulex Corporation, Houston, Texas.

PITTSBURGH'S **SELECTRON** Polyester Resins are playing an important part in the lusty growth of revolutionary new materials for building and decorating. These versatile resins are being used by many makers of colorful panels for skylighting, side lighting and partitioning.

• Among makers of structural panels to whom Pittsburgh is supplying Selectron Resins are The Corrulex Corporation, Houston, Texas, The Alsynite Company of America, San Diego, Calif. and Portsmouth, Ohio, The Resolute Company, Zelienople, Pa., and the Presslite Engineering Company, St. Louis, Mo.

• **SELECTRON** Resins give these panels unusual weather resistance, easy moldability and colorability. Reinforcing fillers give them exceptional strength with low weight, impact toughness and dimensional stability even under severe stresses.

• Being translucent, these panels diffuse daylight without glare. They

possess low thermal conductivity. They are shatter-resistant.

• These panels often cost half as much to install as conventional materials. They are practically maintenance free, being impervious to weather-wear, sunlight, heat, cold, mildew, humidity, rot and most chemicals and fumes.

• **SELECTRON** Resins offer endless possibilities to alert, progressive manufacturers. If you are designing a new product—or redesigning one you are now making—**SELECTRON** may help you make it lighter, stronger, more durable and, possibly, at lower cost. Call on us for advisory service. We'll be glad to have one of our engineers discuss your problems with you without cost or obligation.

Send for **FREE** Booklet

• Write, wire or phone today for our new booklet containing description of **SELECTRON** Polyester Resins and explaining many of the ways in which they can be used. Pittsburgh Plate Glass Company, Selection Products Division, 2000 Grant Building, Pittsburgh 19, Pa.

PITTSBURGH Selectron

INDEX OF ADVERTISERS

MAY 1952

Accurate Molding Corp.	134
Acheson Industries, Inc., Peerless Printing Ink Co. Unit	151
Aeromark Company, The	200
Acme Scientific Company	197
Adamson United Company	156, 157
Aetna-Standard Engineering Co., The	219
Allied Chemical & Dye Corp., Barrett Div.	123
American Anode, Inc.	38
American Cyanamid Company Industrial Chemicals Division	121
Plastics Department	115
American Insulator Corporation	70
American Molding Powder & Chemical Corp.	179
American Plastics Corporation	184
American Pulverizer Company	164
American Wheelabrator & Equip- ment Corp.	192
Amos Molded Plastics	30
Anderson Bros. Mfg. Co.	168
Apex Machine Mfg. Corp.	159
Atlas Powder Company	133
Atlas Valve Company	154
 B. I. P. Engineering, Ltd.	27
Bailey, R. N., Co., Inc.	134
Bakelite Company, A Division of Union Carbide & Carbon Corp.	131, 145, Inside Back Cover
Baker Brothers, Inc.	199
Baker Castor Oil Co., The	209
Ball & Jewell, Inc.	16
Bamberger, A., Corp.	213
Barrett Div., The Allied Chemical & Die Corp.	123
Black-Clawson Co., The, Dilts Ma- chine Works Division	22
Bolts Products Sales, Inc.	44, 45
Boonton Molding Co.	42
Bridgeport Molded Products, Inc.	56
Brosites Machine Company Inc.	190
Brown Company	151
Buttontex Corp.	158
 Cabot, Godfrey L., Inc.	135
Cadillac Plastic Co.	202
Cambridge Instrument Co., Inc.	142
Cameron Machine Company	46
Carbide & Carbon Chemicals Com- pany, A Division of Union Car- bide & Carbon Corporation	149
Carpenter Steel Co., The	136
Carver, Fred S., Inc.	224
Catalin Corporation of America	1
Cavagnaro, John J.	221
Celanese Corporation of America, Plastics Division	9
Chicago Molded Products Corporation	4
Chicago Tool & Engineering Co.	151
Classified	220, 222, 224
Clopay Corporation	165
Consolidated Molded Products Corporation	138
Continental Can Company, Plastics Division	147
Crucible Steel Company of America	52
Cruver Manufacturing Company	28
Cumberland Engineering Co., Inc.	65
Curbell Inc.	175

Dennis Chemical Co.	221
Detroit Stamping Co.	204
Dilts Machine Works Division, The Black-Clawson Co.	22
Dow Chemical Co., The	211
Drakenfeld, B. F., & Co., Inc.	174
duPont de Nemours, E. I. & Co. (Inc.), Electrochemicals Dept.	168
duPont de Nemours, E. I. & Co. (Inc.), Polymers Dept.	7
Durez Plastics & Chemicals, Inc.	Inside Front Cover
 Eagle Tool & Machine Company	160
Eastman Kodak Company, Cellu- lose Products Division	107
Erie Engine & Mfg. Co.	166
Erie Resistor Corp.	223
Ever Ready Label Corp.	195
 Fabricron Products, Inc. Plastics Division	162
Farrel-Birmingham Company, Inc.	227
Fellows Gear Shaper Co., The	51
Flexfirm Products	193
French Oil Mill Machinery Co., The	144
Foucher Machines, Les	188
 Geissel Mfg. Co., Inc.	142
General American Transportation Corp.	33
General Electric Co.	173, Back Cover
General Industries Co., The	176
Gering Products Inc.	66
Girdler Corporation, The	125
Glidden Company, The	26
Goodrich, B. F., Chemical Co., The	3
Goodyear Tire & Rubber Co., The Chemical Division	25, 191
Gries Reproducer Corp.	188
 H. & R. Industries	221
Hardesty Chemical Co., Inc.	159
Harrington & King Perforing Co., The	198
Harwick Standard Chemical Co.	50
Hercules Powder Co.	40, 41
Heyden Chemical Corporation	59
Hinde & Dauch	183
Hobbs Manufacturing Co.	158
Holliday, W. J. & Co., Inc.	189
Hydraulic Press Mfg. Co., The	21
 Ideal Plastics Corporation	11
Industrial Heater Co., Inc.	168
Industrial Plastic & Textile Co.	200
Industrial Research Laboratories	194
Interchemical Corp.	202
International Textile Co.	194
 Jackson & Church Co.	35
Kellogg, M. W., Company, The	34
Kentucky Color & Chemical Co.	186
 Kingsley Stamping Machine Co.	153
Kleemann, O. & M., Ltd.	19
Koppers Company, Inc.	61
Kurz-Kasch, Inc.	17
 Lane, J. H. & Co., Inc.	152
Lethro Machine Works, Inc.	198
Lester-Phoenix, Inc.	32
Lewis Welding & Engineering Corporation, The	180
 Manco Products Inc.	152
Manufacturers' Literature	177, 178
Marblette Corp.	110
Marvol Engineering Company	170
Mayflower Electronic Devices, Inc.	195
Meal Corporation, The	162
Metalsmiths, Div. of Orange Roller Bearing Co., Inc.	138
Metaplast Process, Inc.	164
Metasap Chemical Company	182
Meyercord Company, The	197
Michigan Chrome & Chemical Co.	195
Michigan Molded Plastics, Inc.	204
Mid-America Plastics, Inc.	137
Midland Die and Engraving Company	100
Mills, Elmer E., Corporation	53
Mitts & Merrill	202
Modern Plastic Machinery Corp.	13
Molded Products Corp.	54
Monsanto Chemical Company, Organic Chemicals Division	69, 229
Monsanto Chemical Company, Phosphate Division	29
Monsanto Chemical Company, Plastics Division	215
Monsanto Chemical Company, Texas Division	55
Mosine Paper Mills Company	113
Moslo Machinery Company	137
Muchlstein, H., & Co., Inc.	198
 National Automatic Tool Co.	49
National Lead Company	14
National Rubber Machinery Company	39
Naugatuck Chemical	217
New England Lacquer Company	188
New Hermes, Inc.	139
Newark Die Company	57
Nixon Nitration Works	37
Nordan Plastics Corp.	160
Northern Industrial Chemical Co.	144
 Orange Products, Inc.	159
Orange Roller Bearing Co., Inc., Metalsmiths Div.	138
 Paper Machinery & Research, Inc.	186
Parker-Kalon Corporation	58
Parker Stamp Works, Inc., The	130
Peerless Printing Ink Co., Unit of Acheson Industries, Inc.	151
Peter Partition Corp.	187
Pioneer Lacquer Corp.	129
Pittsburgh Coke & Chemical Co.	31
Pittsburgh Plate Glass Company, Selectron Products Division	225
Plant Installations Ltd.	160
Plastic Binding Corporation	12
Plastic Molding Corporation	150
Plastic Engineering Company	23
Plaskon Division, Libbey-Owens- Ford Glass Co.	105

(Continued on page 228)

THE ODDS ARE 34

TO 1 → 

Farrel-Birmingham® Has Designed Your Calender

Farrel-Birmingham has built every one of the calenders represented by these thirty-four diagrams. As a result, you can be almost certain that the basic design for the "specialized" machine you require has already been worked out by F-B engineers and proved on the job.

But this does not mean that the calender you buy will be an off-the-shelf machine. To the contrary, physical proportions, materials, type of construction, lubricating system, gearing, special operating features — in fact, every detail of every calender is designed for a specific job.

Why not take advantage of Farrel-Birmingham's unequalled experience. We will engineer a calender with any combination of design features and attachments necessary to fill your particular requirements. For further details, send for a copy of Bulletin 174.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N.Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago,
Los Angeles, Houston.

Farrel-Birmingham®

FB-713

32" x 92" four-roll, Z-type
calender with crossed
axes adjusting mechanism
for bottom side roll,
flood lubrication, hy-
draulic pullbacks and
Uni-drive.



INDEX OF ADVERTISERS

(Continued from page 226)

Preis, H. P., Engraving Machine Co. 195
Projectile & Engineering Co. Ltd., The 8
Pyro Plastics Corporation 62, 63

Quinn-Berry Corp. 155

Reed-Prentice Corp. 10
Reichhold Chemicals, Inc. 127
Richardson Company, The 6
Rogers Corporation 48
Rohm & Haas Company, Plastics Products Division, The 47
Rohm & Haas Company, Resinous Products Division, The 205
Royle, John & Sons 196
Rubber Corp. of America 153
Russell Reinforced Plastics Corp. 167

Santay Corporation 181
Schulman, A., Inc. 166
Schwartz Chemical Co., Inc. 224
Scranton Plastic Laminating Corp. 184
Shaw, Francis, & Co., Ltd. 24
Sillcocks-Miller Co., The 196

Sinko Mfg. & Tool Co. 129
Smart & Brown (Machine Tools), Ltd. 60
Standard Machinery Co., The 163
Standard Tool Co. 187
Stanley Chemical Co., The 171
Stokes, F. J., Machine Co. 71-74
Stricker-Brunhuber Corp. 228
Styrene Products Ltd. 64
Swedlow Plastics Co. 207

Tennessee Eastman Co. 119
Therma Electric Co., Inc. 186
Timken Roller Bearing Co., The 185
Titanium Pigment Corp. 20
Transilwrap Co. 196
Tumb-L-Matic, Inc. 172
Tupper Corporation 68

Union Carbide & Carbon Corp., Bakelite Company
131, 145, Inside Back Cover
Carbide & Carbon Chemicals Co. 149

United States Gasket Co. 203
United States Rubber Co. 143

Van Dorn Iron Works Co., The 141
Victory Manufacturing Co. 36

Waterbury Companies, Inc. 171
Watertown Manufacturing Co. 169
Watlow Electric Mfg. Co. 174
Watson-Stillman Co., The 15
Welding Engineers, Inc. 43
Westchester Plastics, Inc. 161
Western Felt Works 174
Wiegand, Edwin L., Co. 67
Windsor, R. H., Ltd. 18
Woloch, George, Products Corp. 221
Wood, R. D., Company 129
Worcester Moulded Plastics Co. 230

Zenith Plastics Co. 117

MODERN PLASTICS

575 MADISON AVENUE • NEW YORK 22, N.Y.

SAVE TIME and MONEY

by letting us create

Pre-Mold Models

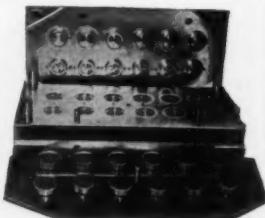
We follow through with

Quality

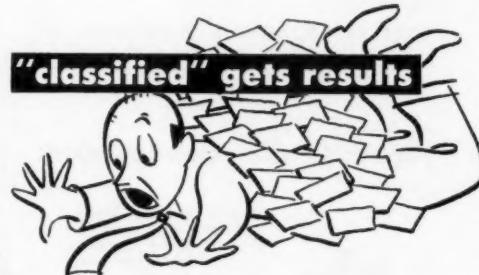
tested

**Production
Molds**

**INJECTION
COMPRESSION
TRANSFER MOLDS**



STRICKER-BRUNHUBER CORP.
Mechanical Developers
19 WEST 24th ST. NEW YORK 10, N.Y.
SB WATKINS 9-6191



With D.O.'s bringing about re-organizations everywhere, there is probably a better market for your used equipment at the present moment than at any time during the past two years.

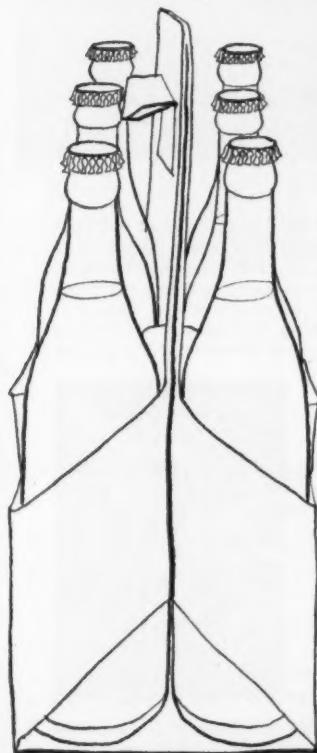
Check the inexpensive rates on "classified" on page 224 of this issue. It will pay you to convert your used equipment into cash now. Write . . .

Classified Advertising Department

MODERN PLASTICS

575 Madison Avenue New York 22, N.Y.

Modern Plastics



putting the right qualities in adhesives for bags, bottles or books



MONSANTO PLASTICIZERS FOR QUALITY ADHESIVES

For Tacky Adhesives:

Ortho-Nitro biphenyl
Dimethyl Phthalate
Dibutyl Phthalate
Santicizer® 160
Santolite® MHP
Santolite MS (80%)
Tricresyl Phosphate
Triphenyl Phosphate

For Heat-Sensitive Adhesives:

Diphenyl Phthalate
Santicizer 1-H
Santicizer 3
Santicizer 9

For Hot-Melt Adhesives:

Dibutyl Phthalate
Santicizer 160
Santicizer 8
Santicizer M-17

For Nontoxic Adhesives:

Santicizer 141
Santicizer B-16
Santicizer E-15



You can select the qualities you want in adhesives for bags, bottles, or books by choosing a Monsanto Plasticizer. In the large family of Monsanto Plasticizers you'll find one or more that exactly fits your needs whether you're making hot-melt, tacky, nontoxic or heat-sensitive adhesives.

The trend is away from the old-fashioned glue pot. It's toward the modern adhesives that give efficient bonding between widely varied materials and meet the needs of high-speed machines for labeling, sealing or fabricating.

Monsanto Plasticizers serve in adhesives based on polyvinyl acetate, zein, casein, polyvinyl butyral, styrene, ethyl cellulose and vinylidene chloride.

When your customers call for adhesives to meet their special needs, investigate the qualities you can attain by using Monsanto Plasticizers. For information on the use of Monsanto Plasticizers, which are available for prompt delivery, contact the nearest Monsanto Sales Office or MONSANTO CHEMICAL COMPANY.

Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

*Reg. U. S. Pat. Off.

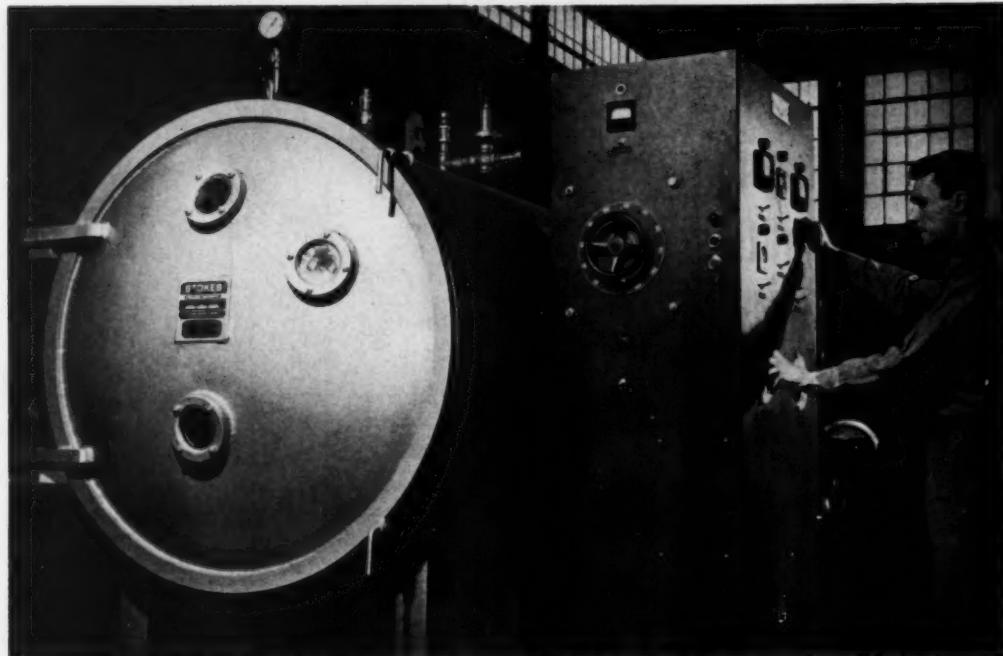
DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto Canada Limited, Montreal.

PLASTICIZERS



WMP Metallized Mouldings...

Shining Examples of Greater Sales Appeal!



Worcester Moulded Plastics' new vacuum plating equipment for metallizing plastics.

WMP, in announcing the installation of large-capacity vacuum plating equipment for metallizing plastics, increases even further the custom moulding service offered you. By bringing your plastics moulding problems to WMP, you gain the advantages of extremely large piece moulding facilities — plus a complete metallizing service for all decorative parts such as large refrigerator insignia, radio cabinets, grills and others. These brilliant, uniform metallic coatings create greater sales appeal as well as new uses for your WMP custom moulded product!

For firsthand knowledge of how WMP custom moulding and economical vacuum metallizing can give you a better product at lower cost, visit our plant.

WMP
Custom Injection Moulding
WORCESTER MOULDED PLASTICS CO.
14 HYGEIA STREET, WORCESTER 8, MASS.
17 East 42nd St., New York 17, N. Y.

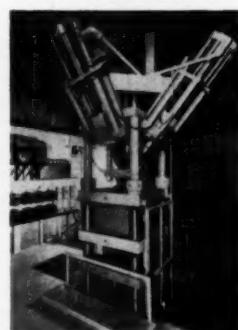
Large Piece Moulding is no problem for WMP's huge Vertical Machine!

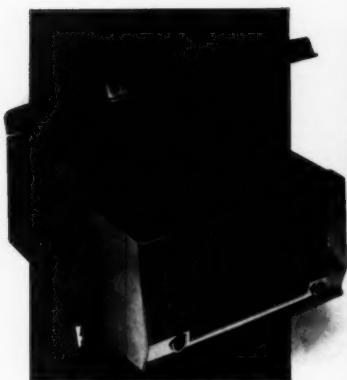
Larger mouldings than ever before are now being made on this WMP developed, engineered and tested machine. Four times the pre-plasticizing capacity — plus 25% more moulding capacity and die clamping pressure — than that of any known moulding machine in existence!

Plan your large-piece moulding with this new WMP giant in mind — and plan to see it soon.

Now — at one moulder, at one plant — are facilities for both moulding and vacuum metallizing 10 lb., 15 lb. and larger pieces, to give you even wider design and sales opportunities for your product or part.

Get your copy of "Plastically Speaking", a new booklet about every phase of WMP custom injection moulding.





Beauty of mahogany mottle finish, fine details, scratch-resistance, light weight and strength at reasonable cost feature this cabinet for Philco radio-phono combination. It's **BAKELITE BM-780 General-Purpose Phenolic**.

Molded by The General Industries Co., Elyria, Ohio, and American Insulator Corp., New Freedom, Pa.



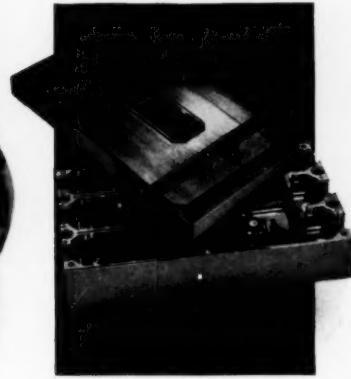
High resistivity, low-loss factor, and dimensional stability are all built into these bases for diheptal tubes in television sets. They're **BAKELITE Natural "Low-Loss" Insulation Phenolic BM-16981**.

Made for Sylvania Electric Products Inc., New York, N.Y.



Strength and stability! This impeller for Sears, Roebuck's Kenmore Dishwasher is made of **BAKELITE Water-Resistant, Improved-Impact Phenolic BM-13080**. It stands up under whirling, scalding water, blasts of hot air, attack by soap and detergents.

Molded by Martindell Molding Co., Trenton, N.J.



Intricate design and electrical resistivity—up to 600 volts AC, 250 volts DC, 10-600 amps—are two of many features of this I-T-E Circuit Breaker case molded of black **BAKELITE General-Purpose Phenolic BM-2498**.

Made for I-T-E Circuit Breaker Co., Philadelphia, Pa., by American Insulator Corp., New Freedom, Pa.



Service for six years without failure on New York's subways—despite weather extremes, moisture, vibration 20 hours a day! It's a subway shoe contact fuse housing that has been molded from **BAKELITE Medium Impact-Resistant Phenolic BM-1132**.

Made for The Horne Products Co. by Boonton Molding Co., Boonton, N.J.



Heat resistance, good electrical properties combine in this magneto distributor plate for heavy-duty automotive equipment. It's **BAKELITE BM-18425 General-Purpose Phenolic** with improved electrical insulation qualities.

Made for American Bosch Corp. by Specialty Insulation Mfg. Co., Hoosick Falls, New York.

Why Phenolic Plastics get the job!

The wide variety of **BAKELITE** Phenolic Plastics means that you can pick the *right* combination of properties to suit your particular purpose.

And with *all* **BAKELITE** Phenolic Plastics, you'll get the plus-factors of strength, beauty, economy, ease of production. Their resistance to chemicals and moisture, good elec-

trical properties, long service life, and light weight are added features you can't afford to overlook.

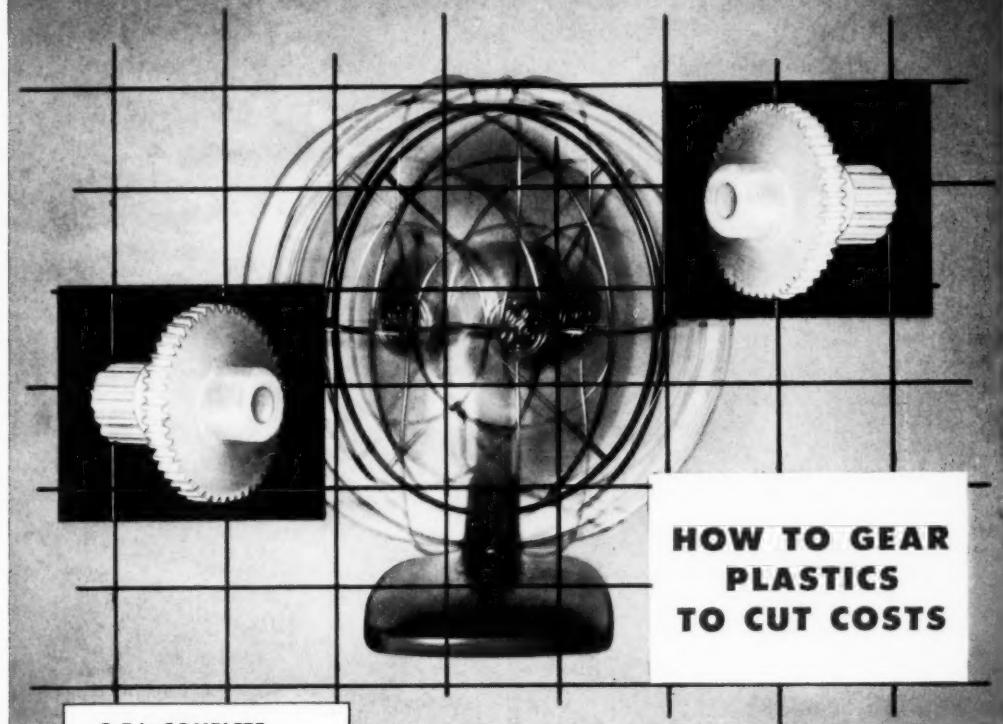
Select the phenolic molding material that's best for your application...put it to work for your product. It means improved design, better performance, more saleability! Our Engineers will be glad to help you. Write Dept. DW-13.

BAKELITE
TRADE-MARK
PHENOLIC PLASTICS



BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N.Y.
In Canada
Bakelite Company (Canada) Ltd., Belleville, Ont.

IDEAS IN PLASTICS FROM G.E.'S MOLDING SERVICE



**HOW TO GEAR
PLASTICS
TO CUT COSTS**

**G.E.'S COMPLETE
MOLDING SERVICE
OFFERS YOU —**

- ✓ Complete mold-making facilities
- ✓ Impartial material selection
- ✓ Injection presses from 3 to 208 ozs.
- ✓ Compression presses from 3 to 36 ins.
- ✓ Complete extrusion facilities
- ✓ Complete silicone rubber fabricating facilities
- ✓ Complete molded mycalex facilities

PLUS the benefit of 60 years' experience in designing, engineering and molding plastics parts.

These molded *plastics* gears, replacing *metal* in an oscillating fan, are an excellent example of how General Electric's *complete* plastics molding service can cut costs for customers—in this case, by no less than 63%!

Part of this substantial saving was accomplished by substituting a nylon gear and pinion, molded as a unit, in place of a steel pinion and laminated plastics gear which required hobbing, cutting and assembling. Besides reducing costs, the new plastics gears wear better and operate more quietly.

You can depend on General Electric's *complete* molding service for cost-saving ideas like this. Perhaps this example will suggest some use for molded plastics in *your* business. If so,

G.E. will be glad to work with you. One of the world's largest plastics molders, G.E. has the "know-how" and facilities to produce your biggest jobs efficiently and economically.

For information, just write to General Electric Company, Section M-2, Chemical Division, Pittsfield, Massachusetts.

You can put your confidence in —

GENERAL  **ELECTRIC**